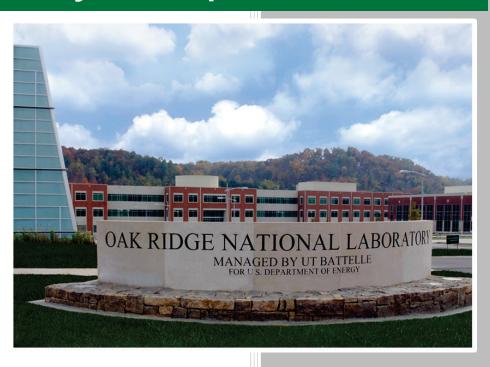
Light Water Reactor Sustainability Program:

Report on the Completion of the Machining of Zion Unit 1 Reactor Pressure Vessel Blocks into Mechanical and Microstructural Test Specimens and Chemical Analysis Coupons



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T. M. Rosseel M. A. Sokolov X. Chen R. K. Nanstad

May 2018

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Materials Science and Technology Division

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LIGHT WATER REACTOR SUSTAINABILITY PROGRAM:

REPORT ON THE COMPLETION OF THE MACHINING OF ZION UNIT 1 REACTOR PRESSURE VESSEL BLOCKS INTO MECHANICAL AND MICROSTRUCTURAL TEST SPECIMENS AND CHEMICAL ANALYSIS COUPONS

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May 2018

Prepared under the direction of the U.S. Department of Energy Office of Nuclear Energy Light Water Reactor Sustainability Materials Research Pathway

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EXECUTIVE SUMMARY

The decommissioning of the Zion Units 1 and 2 Nuclear Generating Station in Zion, Illinois, presented a unique opportunity for developing a better understanding of materials degradation and other issues associated with extending the lifetime of existing nuclear power plants (NPPs) beyond 60 years of service. In support of extended service and current operations of the US nuclear reactor fleet, the Oak Ridge National Laboratory (ORNL), through the Department of Energy (DOE), Light Water Reactor Sustainability (LWRS) Program, coordinated with Zion Solutions, LLC, a subsidiary of Energy Solutions (ES), the selective procurement of materials, structures, and components, from the decommissioned reactors including multiple segments of the Zion Unit 1 Reactor Pressure Vessel (RPV).

As described in three previous LWRS milestone reports, the LWRS Materials Research Pathway acquired (Phase 1) four reactor pressure vessel (RPV) segments were harvested (December 2015) from the Zion Unit 1 NPP and shipped the segments by rail (April 2016) to the Energy Solutions (ES) Memphis Processing Facility (MPF) in Memphis, Tennessee [1]. At the MPF (Phase 2), the Zion Unit 1 RPV ORNL Beltline Weld Segment 1, which contained well-characterized base metal, heat B7835-1, and a section of the well-characterized WF-70 beltline weld (between the lower and the intermediate shells) was cut into seven blocks (September 2016): five base metal and two beltline weld from the high fluence region of the segment [2]. Upon completion of the cutting operation, the seven blocks were packaged and transferred to BWX Technologies, Inc. (BWXT), Lynchburg, VA (October 2016) and the cutting waste and unused RPV segments shipped to the ES waste disposal site in Clive UT (December 2016) [3].

This report documents the machining of through-wall test specimens at BWXT, Lynchburg, VA, and summarizes Phase 1 (harvested segments of the Zion Unit 1 RPV) and Phase 2 (cutting blocks from the Zion Unit 1 RPV ORNL Beltline Weld Segment 1 at the MPF. Specifically, it provides detailed descriptions of the machining of four blocks (3 base metal blocks and 1 weld block) into mechanical test specimens and coupons for microstructural characterization and chemical analysis (Phase 3). Moreover, in Phase 4 of the Zion Harvesting Project (ZHP), through-wall specimens, machined from the beltline WF-70 weld and based metal heat B7835-1 and having a peak fluence < 7 x 10¹⁸ n/cm², will be tested to evaluate the change in mechanical and microstructural properties as function of depth (neutron fuence attenuation). These results will be used to compare with previously reported surveillance data, assess current radiation damage models [4,5,6] and validate current codes and standards for evaluating transition temperature shifts [6].

This project is critically important because access to materials from active or decommissioned NPPs provide an invaluable resource for which there is limited operational data or experience to inform relicensing decisions and assessments of current degradation models to further develop the scientific basis for understanding and predicting long-term environmental degradation behavior.

1. INTRODUCTION

1.1 BACKGROUND

As described in ORNL report, ORNL/TM-2016/240, "Report on the Harvesting and Acquisition of Zion Unit 1 Reactor Pressure Vessel Segments," [1] components and structures in a NPP must withstand a very harsh operating environment, including time at temperature, stress from operational loads, neutron irradiation, and a corrosive media. Moreover, extending reactor service beyond 60 years will increase those demands and possibly introduce new modes of degradation [7]. Although the numerous modes of degradation are complex and vary depending on location and material, understanding and managing materials degradation is key for the continued safe and reliable operation of NPPs. As noted in Volume 3 of the Expanded Materials Degradation Assessment (EMDA) [8], an important element of understanding aging-related degradation modes of the RPV and associated components is the examination of service-aged materials. And an important source of service-aged materials has been the LWRS *Zion Harvesting Project (ZHP)* [4]. This project is important because access to materials from active or decommissioned NPPs provide an invaluable resource for which there is limited operational data or experience to inform relicensing decisions and assessments of current degradation models to further develop the scientific basis for understanding and predicting long-term environmental degradation behavior.

The ZHP, in cooperation with Zion Solutions, LLC, a subsidiary of Energy Solutions (ES), an international nuclear services company, was established in 2011 to coordinate the selective procurement of materials, structures, components, and other items of interest to the LWRS Program from the Zion Station (a former nuclear generating facility), in support of extended service and current operations of the U.S. nuclear reactor fleet. The Zion Station was a decommissioned, two unit, Westinghouse 4-loop PWR facility, with each unit capable of producing 1,040 MWe. The units were commissioned in 1973, permanently shut down in 1998, and placed into SAFSTOR (a method of decommissioning where a nuclear facility is placed and maintained in a condition that allows the facility to be safely stored and subsequently decontaminated to levels that permit release for unrestricted use) in 2010. Materials of high interest include low-voltage cabling, concrete core samples, through-wall-thickness sections of the RPV, and other structures and components of interest to researchers evaluating aging management issues [4, 5, 6].

The RPV is a potentially life-limiting component in light-water reactors (LWR) because replacement of the RPV is not considered a viable option [4]. Researchers studying the effects of radiation on RPV materials have long been interested in evaluating service-irradiated materials to validate codes and standards and physically-informed correlations of transition-temperature-shift predication models [8, 9]. For these reasons, the acquisition of segments (Phase 1) of the Zion Station Unit 1 RPV, cutting the segments into blocks (Phase 2) from the well-characterized beltline weld [10 - 11] and base metal [12,13], and machining the blocks (Phase 3) into mechanical (Charpy, compact tension, and tensile) test specimens and coupons for microstructural (transmission electron microscopy, atom probe tomography, small angle neutron scattering, and micro hardness) and chemical composition characterization (Phase 4) will provide critical data to assess current radiation damage models [4,5,6].

This report documents the machining of through-wall test specimens at BWX Technologies, Inc., Lynchburg, VA and summarizes Phase 1 (harvested segments of the Zion Unit 1 RPV) and Phase 2 (cutting blocks from the Zion Unit 1 RPV ORNL Beltline Weld Segment 1 at the ES MPF) accomplishments.

1.2 CIRCUMFERENTIAL FLUENCE

An important consideration in the evaluation of which RPV segments to harvest is the circumferential fluence. As shown at the bottom of in Figure 1, peak circumferential fluence varies approximately by a

factor of three over a 45° arc from the vertical weld positions to midway between the vertical welds. Based on this variation, the optimum region of beltline weld to harvest is a section midway between the upper (intermediate shell) and lower (lower shell) vertical welds [3].

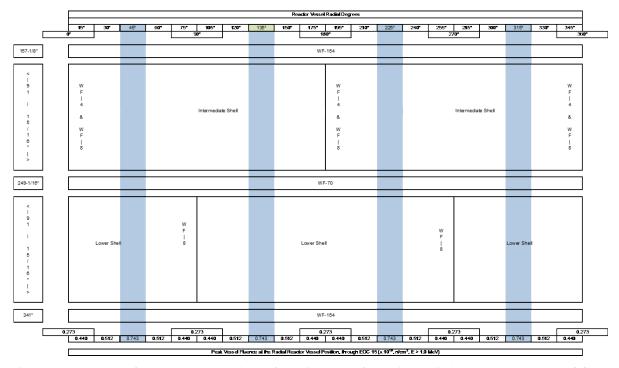


Figure 1. Peak vessel fluence along the circumferential weld of the Zion Unit 1 RPV through End of Cycle (EOC) 13 (x 10^{19} n/cm², E > 1.0 MeV) [14].

1.3 RPV SPECIFICATIONS

The Zion Unit 1 RPV was composed of the head, three ring or shell sections composed of hemispherical plates with two vertical welds, and a bottom plate as shown in the segmentation plan (Fig. 2) with horizontal cuts along the three ring sections (nozzle, intermediate shell, and lower shell) and the bottom plate. It had a total height without the head plate of approximately 419 inches (1,064 cm). The vessel wall had an inner diameter of 173 inches (439 cm) and thickness of 8.8 inches (22.4 cm) over the beltline region. The nozzle ring section is approximately 11 inches thick. Including cladding, the reactor vessel weighed about 700,000 lbs. (317,515 kg) and had a total activity of about 400 curies [3].

1.4 SEGMENTATION

The Zion Unit 1 RPV was cut using an oxy-propylene torch into 17 segments over four levels as shown in Figure 2. Level 1, which includes the inlet and outlet nozzles, was cut into eight 45°segments of 157.5" (400 cm) in height. Level 2 was also cut into eight 45°segments of 157.5" (400 cm) in height and 72.9" (185.2 cm) in length as measured from end to end of the outer diameter. Because the vessel could not be rotated 22.5° after the nozzle segments were cut due to the location of the overhead bridge, the level 2 segments, which include most of the intermediate shell and a portion of the lower shell and the well-characterized WF-70 beltline weld, were cut along the same vertical lines as the nozzle cuts i.e., at the two vertical welds of the intermediate shell, directly above the vertical welds of the lower shell, and in the middle of the peak circumferential fluence (Figure 1). Moreover, four segments (including 1 and 2) also contained the well-characterized base metal B7835-1 in the upper shell (Figure 2 and Figure 3). The

beltline pieces cut from the vessel are 8.8 inches thick including a 3/16th inch stainless steel cladding on the internal surface. Each piece weighed approximately 28,000 lbs. (12,727 kg). [3]

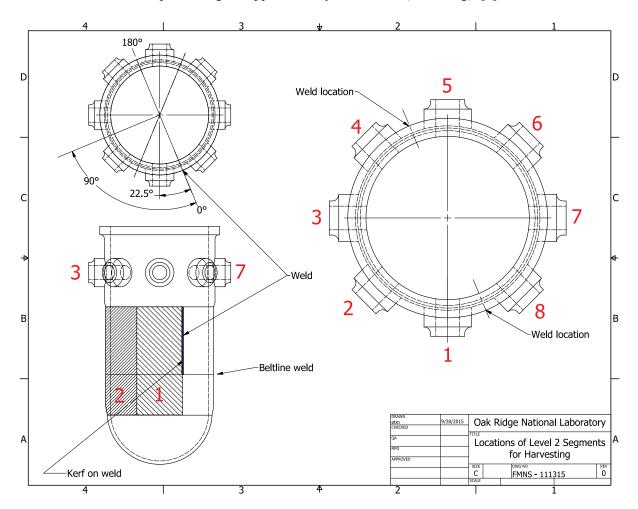


Figure 2. Identification of Level 2 segments (1, 2, 5, and 6) collected as part of process to harvest Segment 1. Segment 1 (as well as Segments 2) contains the well-characterized base metal B7835-1 (intermediate shell) and a section of the well-characterized WF-70 beltline weld [15].

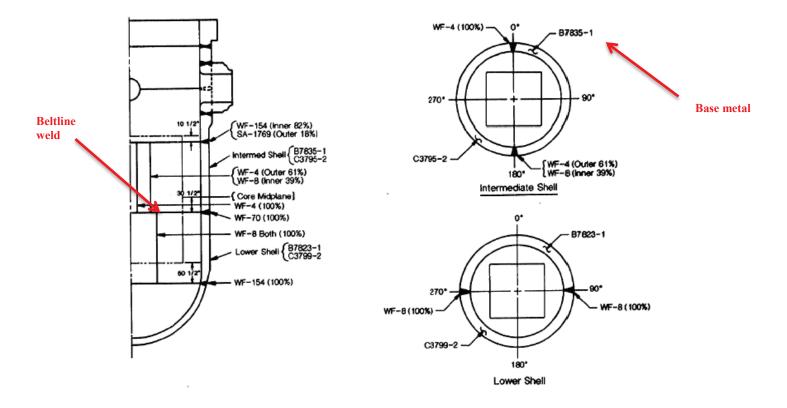


Figure 3. Location of materials (weld and base metal) used in the fabrication of the Zion Unit 1 beltline (intermediate shell to lower shell), two vertical welds above the beltline, and base metal heats [16].

2. ZION RPV PHASE 1: HARVESTING

As previously described [1, 2, 3 5, 6,], the Zion Unit 1 Beltline Weld Segment 1, with dimensions of ~ 13' x 6' (157.5" x 72.9" x 8.8") and containing the well-characterized WF-70 beltline weld and the well-characterized base metal heat B7835-1 (Figure 3), was cut from just below the circumferential weld between the nozzle section and the intermediate shell to just above the circumferential weld between the lower shell and the bottom plate using an oxy-propane torch (Figure 4). The right edge (as viewed from the outer wall of the RPV) begins at the 0° / WF-4 vertical weld (Figure 2 and Figure 3). The cut segment (Segment 1) was removed using a gripper crane and positioned onto the "down-ender" frame to allow proper positioning in the steel-shipping box. The first segment was loaded face up and the matching segment (opposite side segment: Segment 5) was loaded face down to provide clam-shell shielding in the same manner as used to ship RPV sections to the Energy Solutions, Clive, Utah waste disposal site [3].



Figure 4. Vertical cut using an oxy-propane torch of a Zion Unit 1 RPV Level 2 Segment [15].

3. TRANSPORTATION OF ZION RPV SEGMENTS TO ES MPF

Due to the size and weight of the four (Segments 1 and 5 and Segments 2 and 6) Zion Unit 1 RPV Level 2 beltline sections, (~ 13' x 6' or 157.5" x 72.9" x 8.8" thick including a 3/16th inch SS cladding on the internal surface, weighing ~ 28,000 lbs. each) in two large steel boxes with a combined weight of ~180,000 lbs, a rail car was used to ship the RPV segments to the Energy Solutions, MPF site on March 31, 2016, for cutting Segment 1 into blocks for eventual specimen machining. On April 12, 2016, the railcar containing the four segments arrived at the Energy Solutions MPF site and was received, inspected, and temporarily stored while a revised contract with Energy Solutions for cutting seven blocks from the Zion Unit 1 RPV Segment 1 was finalized. The cutting phase of the project (Phase 3) began on June 20, 2016 [2].

4. PHASE 2: BLOCK CUTTING

As shown in Figure 5 and Figure 6, seven blocks, varying in length from approximately 5.7 x 2.0 x 8.8 inches to 7.6 x 3.0 x 8.8 inches to 11.25 x 3.0 x 8.8 inches and designated "F," "C," and "CF," were cut using a diamond wire saw from ORNL RPV Segment 1. The plan for the 4 "F" block was to machine it into compact tension specimens for fracture toughness testing; the 2 "C" blocks to machine it into Charpy V-notch (CVN), SS-3 tensile specimens, and coupons for chemical and microstructural characterization; and the "CF" block machined into alternating rows of Charpy blocks (CVN, tensiles, and coupons) and compact tension specimens for fracture toughness testing. Prior to cutting the "C1," and "CF," blocks, the centerline of the beltline weld was identified using chemical etching on the through thickness cross-section of the segment. Each of the seven (7) blocks were uniquely numbered for identification, orientation, and tracking (Figure 7) and packaged for shipment to the Phase 3 machining vendor (BWXT). The cutting waste and remaining unused segments was packaged and shipped to the Energy Solutions, Clive, Utah site (see Section 6 for details) [3].

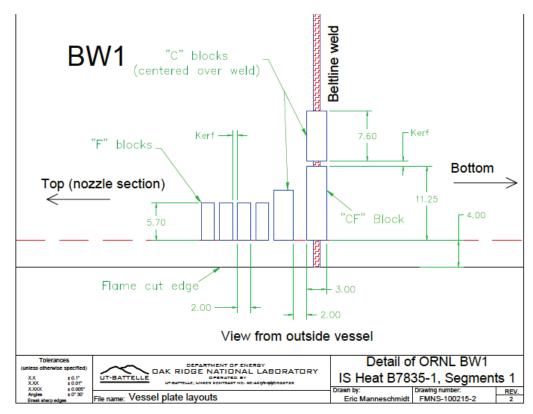


Figure 5. Location of 5 base metal and 2 beltline blocks cut from Zion Unit 1 RPV Segment 1.

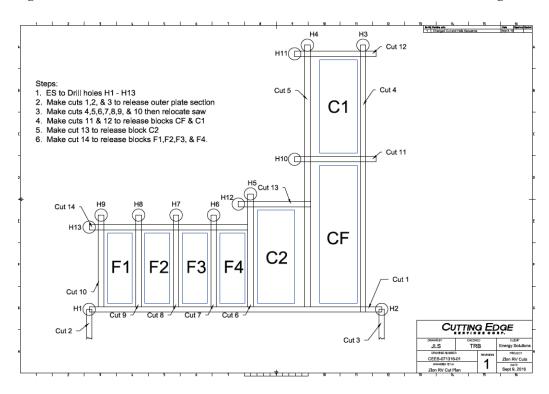


Figure 6. Cut plan (based on Figure 5) noting the blocks (blue outline), the wire saw access holes and cut lines with kerf. [15]



Figure 7. The four "F," two "C," and single "CF" blocks were marked and the orientation noted (Y axis is perpendicular to the beltline weld with the arrow pointing to the top of the segment and the X axis is parallel to the beltline weld with the arrow pointing away from the high fluence edge) [15].

5. PACKAGING AND TRANSPORTATION TO BWXT

Seven RPV blocks cut from the Zion Unit 1 RPV Segment 1 at the MPF, with individual lift magnets attached, were loaded into two 55-gallon drums with **F1-F4** blocks (fracture toughness samples) in one drum and CF (Charpy, tensile, and fracture toughness samples), C1, and C2 (Charpy and tensile specimens) in the second drum. Following the loading of the Zion RPV blocks, the two drums were loaded into a B-25 box with 1" steel shielding beneath and 1" steel shielding around the side of the drum as shown in Figure 8. Sand was added into the B-25 box as a filler material and provides additional shielding as seen in Figure 9. Since the dose rates with the shielding, including the bottom plate, were within Energy Solutions administrative limits for shipping (and consequently within U.S. DOT limits), no additional shielding was added to reduce these dose rates (except for the sand fill). On October 27, 2016, the B-25 box containing the sample bearing drums was loaded onto a flatbed trailer, secured and shipped to BWXT in Lynchburg, Virginia. The B-25 box arrived on October 28th at the BWXT site and was unloaded without incident [3].



Figure 8. Two drums loaded into the B-25 box with 1" steel shielding beneath and surrounding the drum.



Figure 9. Final layout of the B-25 box with sand added.

6. BLOCK CUTTING WASTE DISPOSAL

The waste resulting from the weld position identification work and block cutting was placed into B-25 boxes which in turn were loaded into a 20' "sealand" container and loaded onto an ABC flat car (Figure 10) and shipped by Canadian Railroad to the ES Clive, UT waste disposal site. This ABC flat car was also loaded with 3 other sealand containers holding waste from other ES MPF projects. "Sharing" this ABC car lowered rail transport costs for the LWRS waste. The ES MPF targeted shipment of the ABC rail car and the gondola car holding Zion Unit 1 segments 2, 5, and 6 and partial segment 1 to Clive, UT, in December 2016. Moreover, the Zion Harvesting Project was only responsible for cost differential for shipping the gondola car with the segments to Clive from Memphis vs. the cost to ship the segments to Clive from Zion [3].



Figure 10. ABC railcar with multiple sealed containers for shipment to the ES Clive Utah waste site [15].

7. PHASE 3: MACHINING SPECIMENS FROM BLOCKS:

The work performed in this section of the report was performed by BWXT NOG Technologies, Inc. under Subcontract Number 4000149923 with ORNL/UT Battelle. Specifically, it describes the results of machining irradiated specimens from blocks cut from ORNL Beltline Weld Segment 1, which was harvested from the Zion Unit 1 RPV. Moreover, the through thickness chemical compositions of both the base and weld metal were obtained using Laser Ablation, Inductively Coupled Plasma Mass Spectroscopy (LA ICPMS).

7.1 INTRODUCTION

A kick-off meeting with the BWXT machining team was held in Lynchburg, VA on Thursday, October 27, 2016. The purpose was to review the details of the machining plans, including the removal of the cladding, the block orientation to clearly identify the location of the high fluence edge and relationship to the top / bottom of the RPV, how to best fit the proposed ORNL cut plan into the actual dimensions of the cut blocks, developing unique sample identification numbers, surface finish, the final identification of the C and F reserve blocks, block cutting order (2 F blocks, followed by C2 and CF blocks) and the estimated schedule for the project.

The work scope, which originally included facility preparation, visual inspections, machining using conventional CNC and wire electrical discharge machining (EDM), specimen labeling and packaging, disposal of radioactive waste, project management, and reporting, was expanded in March 2017 to perform through-wall chemical analyses of selected locations through the thickness of the C2 base metal block and the CF beltline weld block and at both ends of the block (highest to lowest fluence along the circumferential direction).

7.2 BLOCK RECEIPT

7.2.1 Overview

The Zion blocks were received by BWXT on October 28, 2016. After receipt, the blocks were photographed and the seven blocks designated: **F1**, **F2**, **F3**, **F4**, **C1**, **C2**, and **CF**, were inventoried. As part of the Civilian Nuclear Working Group (CNWG) framework, the LWRS Program provided the Central Research Institute of Energy Power Industry (CRIEPI) with base metal block "**F2**" for their investigation and collaboration with the LWRS Program.

7.2.2 Block Orientation

The seven blocks cut from the ORNL Zion Unit 1 Beltline Weld Segment 1 were cut four (4) inches off center from the vertical hotline to avoid material that may have experienced annealing during the flame cutting of the RPV segments [2]. Moreover, since the fluence was higher along this edge of the segment and blocks, specimen machining was performed as close to the block edge as feasible. The following section outlines the orientation and markings on each block to achieve traceability to the reactor vessel location.

Figure 11 shows the outer diameter view of the sectioned reactor vessel. Blocks F1, F2, F3, F4, and C2 are base medal, while blocks CF and C1 encompass the beltline weld.

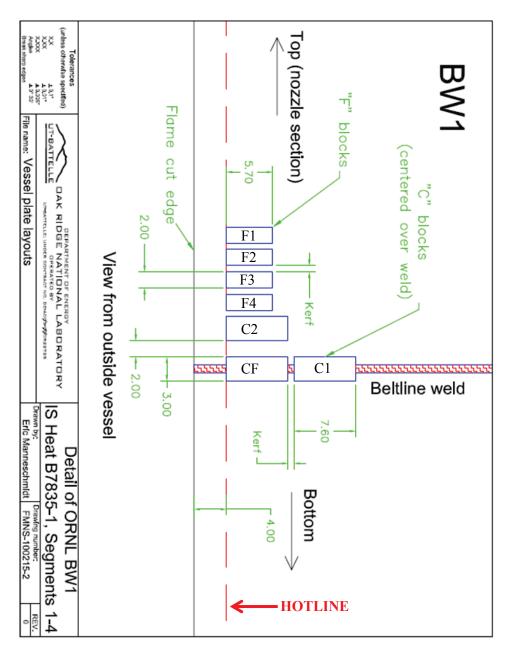


Figure 11. ORNL provided orientation drawing with block labels. The hotline in the z axis is shown with a dashed red line.

7.2.3 As-Received Condition

Once the blocks arrived at BWXT, they were removed from the shipping containers and photographed to document the "as received" condition. All the blocks were photographed (Figure 12 – Figure 18) in the same orientation as shown in Figure 11. Figure 12 has been labeled to serve as an orientation guide for the remaining block photos. The axes marked with arrows on the outer diameter of the blocks show the z axis (vertical direction pointing to the top of the RPV) and the theta/circumferential axis (horizontal direction). This orientation was carried through all machining steps and marked on all remnant pieces. The edge of the blocks farthest in the negative theta direction (left side of the photo) was the one closest to the hotline

in the reactor. An effort was made by BWXT, in consultation with ORNL, to machine as many specimens from the negative theta/inner diameter corner of each block to obtain samples with the highest fluence.

7.2.3.1 Block F1

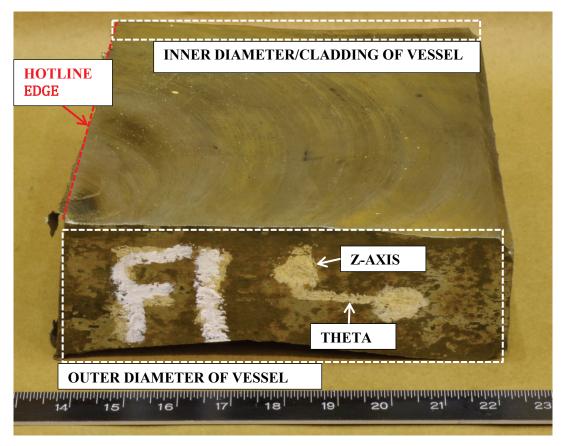


Figure 12. Base metal – block F1 as-received condition [17].

7.2.3.2 Block F2



Figure 13. Base metal – block F2 as-received condition [17].

7.2.3.3 Block F3



Figure 14. Base metal – block F3 as-received condition [17].

7.2.3.4 Block F4



Figure 15. Base metal – block F4 as-received condition [17].

7.2.3.5 Block C2



Figure 16. Base metal – block C2 as-received condition [17].

7.2.3.6 Block C1



Figure 17. Block C1 as-received condition [17].

7.2.3.7 Block CF



Figure 18. Block CF as-received condition [17].

7.3 CLADDING REMOVAL

The first machining operation was the removal of the cladding from each of the seven blocks. To reduce kerf and maximize usable material near the inner diameter of the vessel, each block was stripped of the cladding using an electrical discharge machine (EDM). The cladding was stored and blended with lower activated material and will be disposed of as waste.

Removal of the cladding from the blocks began on Friday, November 4, with a straight \sim 0.1" cut above the apex of the cladding, approximately 0.35" into the block from the outside of the cladding. The cladding thickness was measured manually to verify that no remnant pieces remained on the carbon steel block. The cut was made with 0.010" diameter wire. A rough sketch of the cut is shown in Figure 19.

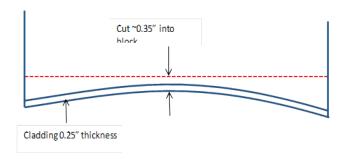


Figure 19. Sketch of 5/16" cladding cut off the Zion Unit 1, Segment 1 blocks [17].

This operation concluded the machining of Blocks F1 and C1, which have been shipped to ORNL for future evaluation. Figure 20 shows an EDM cut that removed the cladding on block F4 and the separated cladding. The orientations were maintained on the cladding. All blocks had the cladding removed in this manner.





Figure 20. Block F4 cladding removed via EDM (top view) and separated cladding slab with orientation noted [17].

7.4 SPECIMEN DETAIL DRAWINGS

In this section, detailed specimen drawings (Figure 21 – Figure 26) and the general machining steps are outlined for each type of specimen and will be referenced in the discussion of the individual block machining in Sections 7.4 - 7.9 and include block specific details such as specimen identification, dimension verification, and dose rates prior to shipment to ORNL.

7.4.1 0.5T Compact Tension Specimen (Blocks F3 and f4)

Machining Technique:

- Cut slabs from the F3 and F4 blocks to 0.500" thickness
- Drill pilot holes through the slab for EDM threading using a computer numerically controlled (CNC) end mill
- Cut hole final dimensions using an EDM
- Cut final profile using an EDM
- Place specimen on dot matrix to be labeled (Sections 7.5.2 and 7.6.2)
- Measure and record dimensional QA (Appendix A)

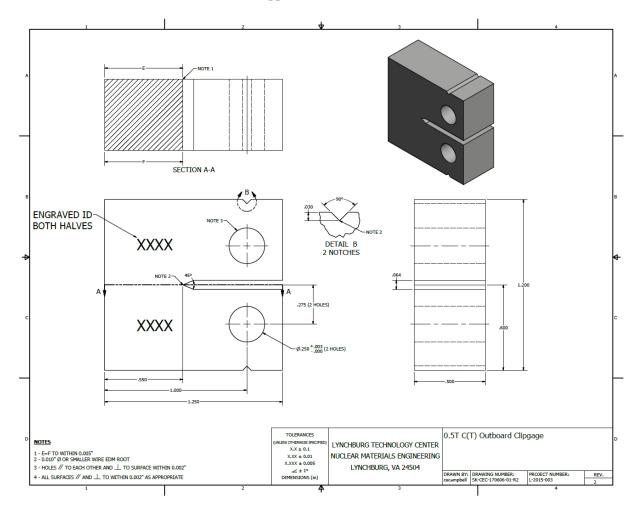


Figure 21. 0.5T compact tension detail drawing.

7.4.2 0.4T Compact Tension Specimen (Alternating rows of Block CF)

Machining Technique:

- Cut a slab from alternating rows of block CF to 0.400" thickness
- Drill pilot holes through the slab for EDM threading using a CNC end mill
- Cut hole final dimensions using an EDM
- Cut final profile using an EDM
- Place specimen in dot matrix to be labeled (Section 7.8.1.6)
- Measure and record dimensional QA (Appendix A)

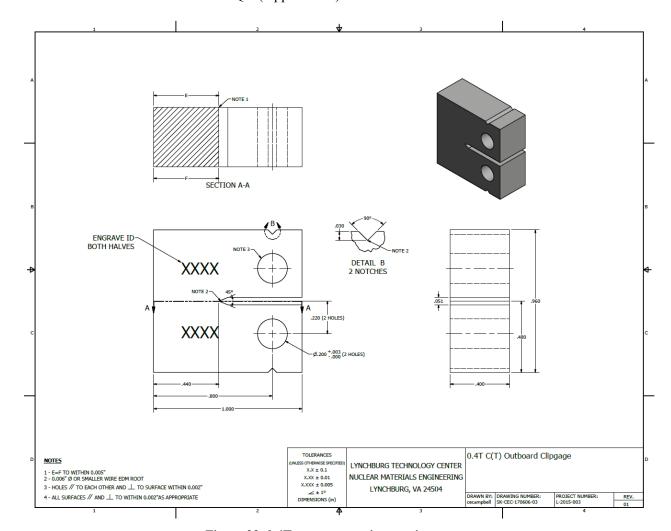


Figure 22. 0.4T compact tension specimen.

7.4.3 Charpy V-Notch Specimen (Block C2 & alternating rows of Block CF)

Machining Technique:

- Mill entire block to a thickness equal to 2.165"
- Cut the 0.394" x 0.394" (Charpy block) profile via EDM
- Fixture (2.165" x 0.394" x 0.394") blanks on vertical mill to be notched

- Place specimen in dot matrix to be labeled (Section 7.7.2 and 7.8.1.6)
- Measure and record dimensional QA (Appendix A)

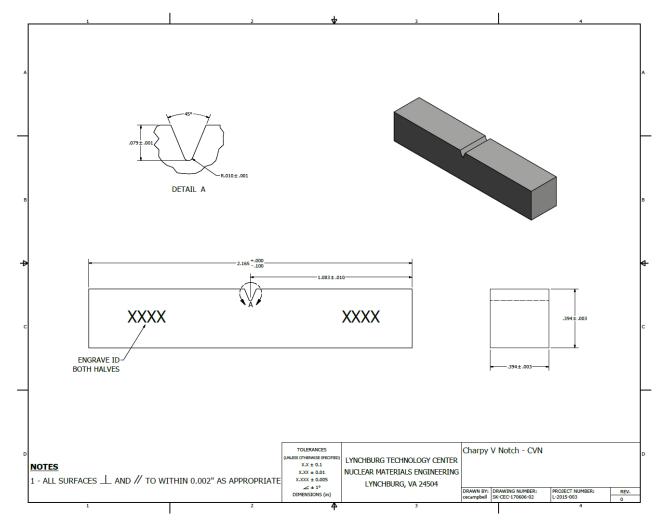


Figure 23. Charpy V Notch specimen.

7.4.4 Microstructural Specimen Coupons (alternating rows of Blocks C2 & CF)

Machining Technique:

- Fixture CVN blank on the EDM
- Cut the 0.394" x 0.394" x 0.020" profile using an EDM
- Vibra-etch specimen to label (Sections 7. 6.2 and 7.7.2)
- Measure and record dimensional QA (Appendix A)

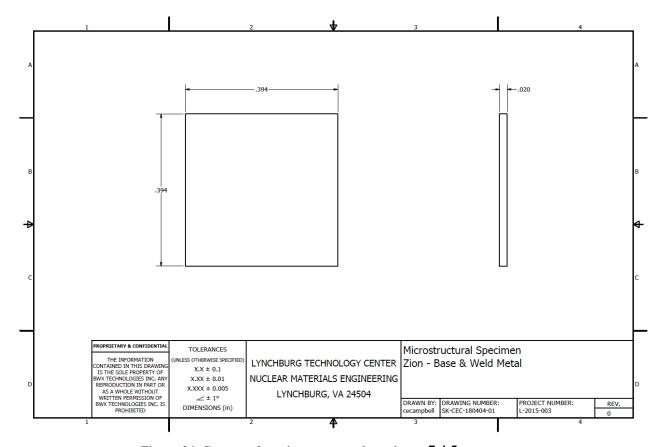


Figure 24. Coupons for microstructural specimen. 7.4.5

(unlimited use by ORNL since drawing is not BWXT Proprietary)

SS-3 Tensile Specimen (alternating rows of Blocks C2 & CF) Machining Technique

- Fixture CVN (2.165" x 0.394" x 0.394") blank on the EDM
- Cut the SS-3 profile using an EDM that is in the 0.394" thickness direction
- Retrieve, rotate, and re-fixture the profile
- Cut the specimens to a 0.030" thickness using an EDM
- Place specimen in dot matrix to label (Sections 7.6. 2, 7.7.2, and 7.8.1.6)
- Measure and record dimensional QA (Appendix A)

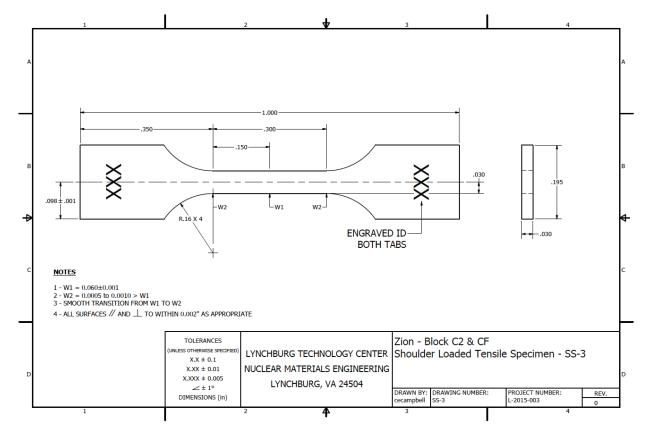


Figure 25. SS-3 shoulder loaded tensile specimen.

7.4.6 Miniature Compact Tension Specimen (Blocks F3, F4, and CF)

Machining Technique

- Cut a slab to 4.15 mm thickness
- Drill pilot holes through the slab for EDM threading using a CNC end mill
- Cut hole final dimensions using an EDM
- Cut final profile using an EDM
- Vibra-etch top and bottom halves of specimen to label (Sections 7.5.2, 7.6.2, and 7.8.1.6)
- Measure and record dimensional QA (Appendix A)

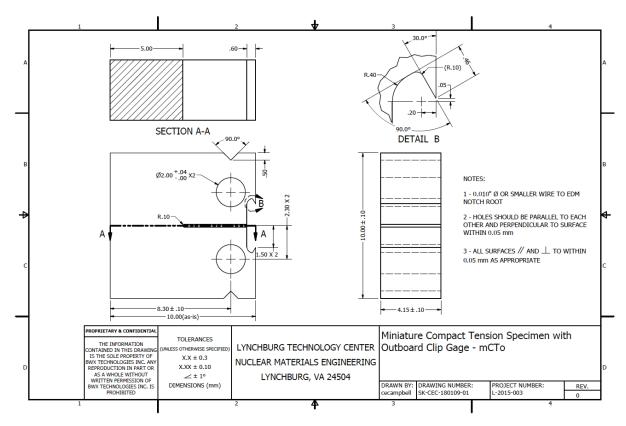


Figure 26. Miniature compact tension specimen (mini-C(T)) with an outboard clip gage notch.

(unlimited use by ORNL since drawing is not BWXT Proprietary)

7.5 BLOCK F3

As shown in Figure 27, 56 0.5T compact tension C(T) specimens were to be machined from blocks F3 and F4 with an orientation of 4 specimens along the theta (circumferential direction) and 14 rows through the thickness of the block [5,6]. However, due to several machining anomalies (marked with a red X) in rows A, C, K, L, and M, BWXT, in consultation with ORNL, agreed to machine up to 9 mini-C(T) specimens to replace each of the lost 0.5T specimens from the first two blanks in rows K, L, and M so as to have a sufficient number of samples for a valid ASTM E-1921 test. To maintain the integrity of the data, the mini-C(T) specimens were machined from the rejected 0.5T specimens rather than a different location further from the hotline. Table 7.5-1 lists the number of specimens machined from block F3.

Type Table 7.5-1. P	Block F QSpetitn en Overview.	Drawing
0.5T	48	Figure 4.1
mini-C(T)	28	Figure 4.6
Total	76	-

7.5.1 Machining

7.5.1.1 0.5T Compact Tension

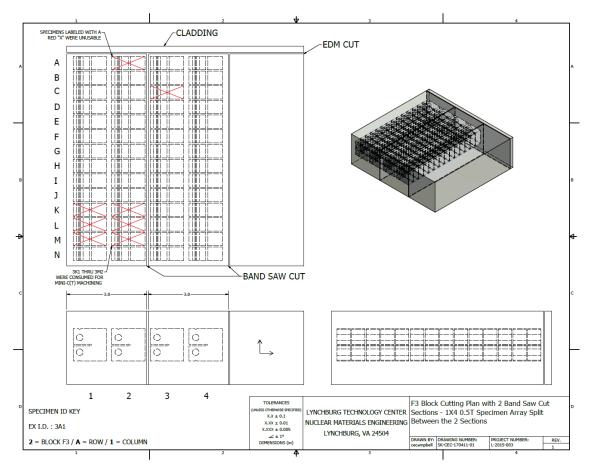


Figure 27. Block F3 cutting plan overview.

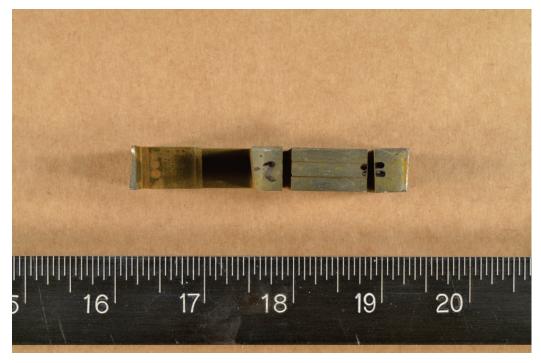
Prior to machining the F3 block 0.5T specimens, BWXT proposed and ORNL agreed to a cut plan using a 2x2 array to obtain specimen with the maximum fluence. However, once the first section was cut on the band saw, it became apparent that the inner block thickness was too thin to stack the specimens vertically in the z-axis. To accommodate the original 1x4 array, a second section was cut such that it split the two sections. The 0.5T specimen machining then followed the outline in Section 7.4.1. The F3 block remnant and the slabs from the first step of machining are shown below in Figure 28.



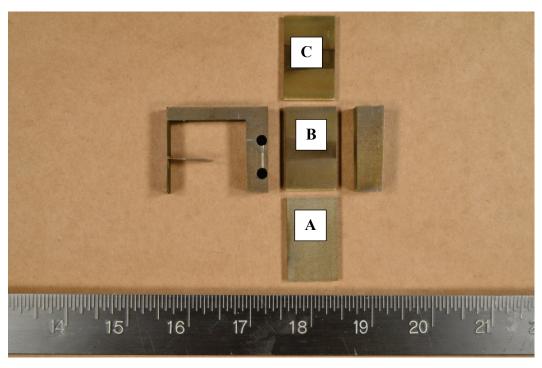
Figure 28. 0.5T slabs and remnant piece of block F3 [17].

7.5.1.2 Miniature Compact Tension

As stated in the Section 7.5.1, mini-C(T) specimens were machined from the rejected 0.5T specimens in layers K, L, and M. The slabs for these specimens were cut intentionally to a 4.00 mm thickness so that three slabs could be retrieved from the 0.5T remnants. The following figures show the sectioning of the mini-C(T) specimens. Specifically, and as shown and noted in Figure 29 – Figure 31 and listed in Appendix A, 9 mini CTs were machined from damaged specimen 3K2 (3 each from positions A [3K2A-1,-2,-3], B, and C), 9 mini CTs were machined from damaged specimen 3L1; and 6 mini CTs from specimen position 3M1 and 4 mini CTs from position 3M2 for a total of 28 mini CTs (Table 7.5-1). Since specimens 3A2 and 3C3 did not have sufficient material to machine 9 mini CTs, additional mini CTs were machined from Block F4 (Figure 33).

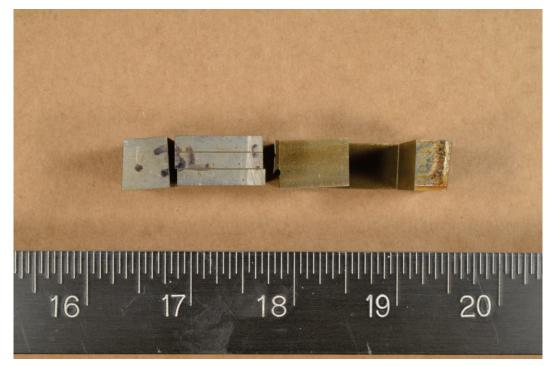


(TOP VIEW)

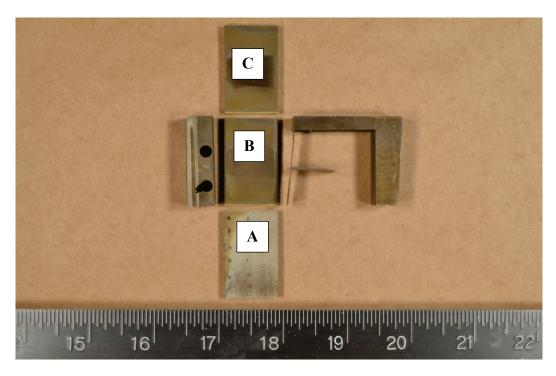


(FRONT VIEW)

Figure 29. Block F3 layer K-9 total specimens were cut from the slabs [17].

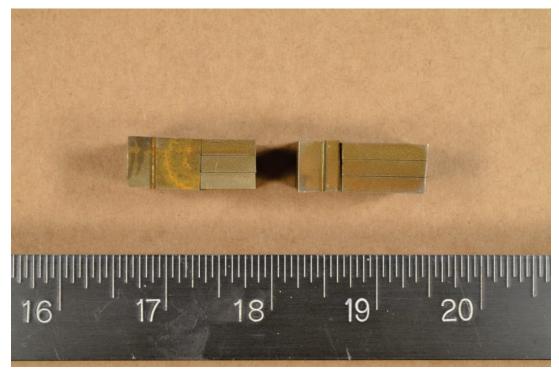


(TOP VIEW)

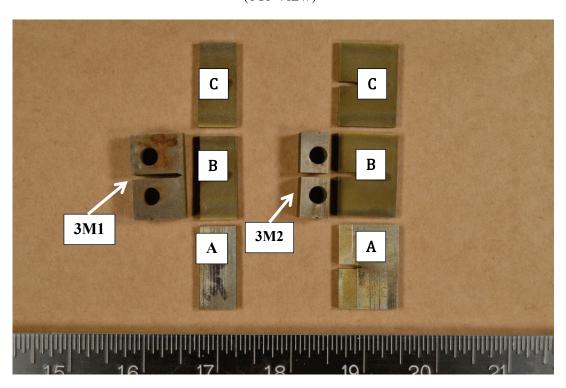


(FRONT VIEW)

Figure 30. Block F3 layer L-9 total specimens were cut from the slabs [17].



(TOP VIEW)



(FRONT VIEW)

Figure 31. Block F3 layer M – 10 total specimens were cut from the slabs [17].

7.5.2 Specimen Identification

The traceability of each specimen to the original position within the block was paramount during this project. The table below outlines the labeling convention for each specimen type cut from block F3.

Table 7.5-2. Block F3 Specimen ID Definitions.

Specimen Type	Example ID	Definition
0.5T Compact Tension	3K3	3 = Block F3 / K = row / 3 = column
mini-C(T)	3K2A-1*	3K2 = 0.5T ID / A = slab closest to cladding / 1 = top specimen in a 1x3 column

^{*}Figure 29 – Figure 31 for reference on slabs.

7.5.3 Specimen Dimension Verification (Appendix A)

As noted in the specimen matrix as shown in Figure 28, 0.5T specimen marked with a red "X" were rejected during the QA process. Table 7.5-3 summarizes the machining errors and the corresponding resolution.

Table 7.5-3. Block F3 Specimen Rejection Overview.

Specimen/s	Error	Resolution
3A2	Anomaly	Machine mini-C(T)s from Block F4
3C3	Anomaly	Machine mini-C(1)s from Block F4
3K1 - 3K2	Specimen cut after part off	
3L1 - 3L2	Anomaly	Sacrifice 0.5T for mini-C(T)s – 3K2, 3L1, 3M1, & 3M2. No specimens cut from 3K1 & 3L2.
3M1 - 3M2	Specimen cut after part off	5M2. No specimens cut from 5K1 & 5L2.

The specimen QA documentation for block F3 can be found in Appendix A – Block F3.

7.5.4 Dose Rates

During the packaging process each row of 0.5T specimens was measured for dose rate at 2". The packaged rows were photographed and are shown in Figure 32. Note that rows K, L, and M include the mini-C(T)'s. The dose rates showed a distinct gradient through the thickness of the reactor vessel. The dose rate information is listed in Table 7.5-4.



Figure 32. Block F3 0.5T & mini-C(T) specimens packaged for shipment [17].

Table 7.5-4. Block F3 Specimen Radiation Levels.

Row ID – Bagged Groups (0.5T and mini-C(T))	Rad Level (mR/hr@2")
3A	55
3B	40
3C	27
3D	18
3E	13
3F	10
3G	8
3Н	7
3I	6
3J	5.5
3K*	3
3L*	2
3M#	2
3N	3.5

^{* 9} mini-C(T)s and two 0.5 C(T)s and 10 mini-C(T)s and two 0.5 C(T)s

7.6 BLOCK F4

Like base metal block F3, the F4 machining plan called for the machining of 56, 0.5T, compact tension C(T) specimens from a 2 x 2 array as shown in Figure 33. As described in the block F3 summary, several 0.5T samples were rejected. The reconciliation for the lost samples was to machine additional mini-C(T) specimens from the same row location (A & C) as the "lost F3 0.5T specimen out of block F4. Therefore, 20 additional mini-C(T) specimens were machined from the remnant piece of block F4 as shown in Figure 33 (blue ellipses). The total number of machined specimen from block F4 is outlined in Table 7.6-1.

 Type
 Quantity
 Drawing

 0.5T
 56
 Figure 21

 mini-C(T)
 20
 Figure 26

 Total
 74

Table 7.6-1. Block F4 Specimen Types & Quantities.

7.6.1 Machining

7.6.1.1 0.5T Compact Tension

Block F4 was the thicker than F3, which allowed the specimens to be stacked in a 2 x 2 matrix along the hotline side of the block. This both conserved material and placed the specimens in a higher fluence position within the block. The first operation was to separate off the portion to be used for 0.5T machining via band saw. The 0.5T specimen machining then followed the outline in Section 4.1.

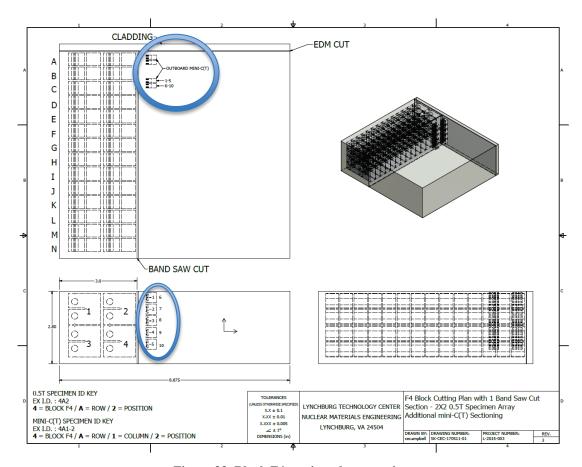


Figure 33. Block F4 cutting plan overview.

7.6.1.2 Miniature Compact Tension

After the 0.5T specimens were cut off and slabbed out, two small slabs along the circumferential direction were cut out to machine the mini-C(T) specimens in rows A and C, position 3 and labeled 4A1- (1-5) and 4A2 (6-10) and 4C1-(1-5) and 4C2 (6-10). The slabs for both the mini-C(T) and 0.5T specimens are identified in Figure 33, Figure 34, and Figure 35.

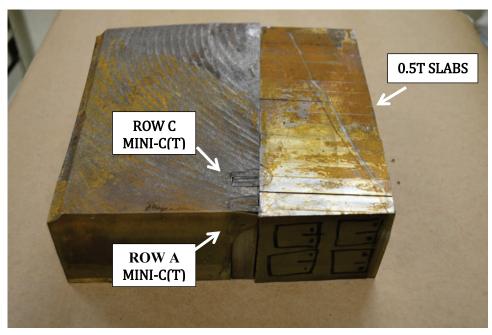


Figure 34. Block F4 0.5T and mini-C(T) slabs in relation to remnant [17].

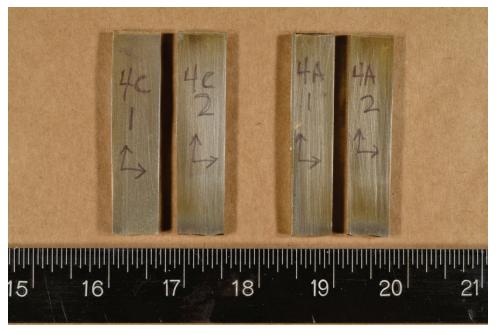


Figure 35. 10 mini C(T) specimens each were cut from layers A and C [17].

7.6.2 Specimen Identification

The traceability of each specimen to the original position within the block was paramount during this project. Table 7.6-2 outlines the labeling convention for each specimen type cut from block F4.

Table 7.6-2. Block F4 Specimen ID Definitions.

Specimen Type	Example ID	Definition
0.5T Compact Tension	4B3*	4 = Block F4 / B = row / 3 = matrix location
mini-C(T)	4C1-4*	4 = Block F4 / C = row / 1 = column / 4 = position

^{*}refer to Figure 32, Figure 33, and Figure 34 for location and position within rows

7.6.3 Specimen Dimension Verification

There were no rejections during the QA review process for block F4 (Appendix A).

7.6.4 Dose Rates

During the packaging process, each row of 0.5T specimens was measured for dose rate at 2". The packaged rows were photographed and are shown below in Figure 36. The dose rate information is listed in Table 7.6-3.



Figure 36. Block F4 0.5T & mini-C(T) specimens packaged for shipment [17].

Table 7.6-3. Block F4 Specimen Radiation Level.

55 40 26
26
19
14
12
11
9
8
7
5.5
4.4
4.2
4.2

^{*}includes 10 mini-C(T)s at 4A3 and 4C3 and labeled: 4A1 (1-5), 4A2 (6-10), 4C1 (1-5) and 4C2 (6-10)

7.7 BLOCK C2

Block C2 was the first of the four blocks machined by BWXT. It was chosen to be first to evaluate machining protocols and to ensure cutting protocols would be optimized when machining the beltline weld Block CF. The quantity and type of specimens cut from block C2 are outlined below in Table 7.7-1. The detailed drawing for each specimen type may be found in Figure 23 – Figure 25 and Figure 38.

Table 7.7-1. Block C2 Specimen Types & Quantities.

Туре	Quantity	Drawing
CVN	245	Figure 23
Microstructural (MS)	68	Figure 24
SS-3	134	Figure 25
Chemical Composition (CC)	17	Figure 38
Total	464	-

7.7.1 Machining

7.7.1.1 CVN

The base metal C2 block was milled to the thickness equal to the length of a CVN, 2.165". After milling to the correct thickness, an EDM was used to cut a matrix of 15x17 CVN specimen blanks. The specimen matrix is outlined below in the Figure 37.

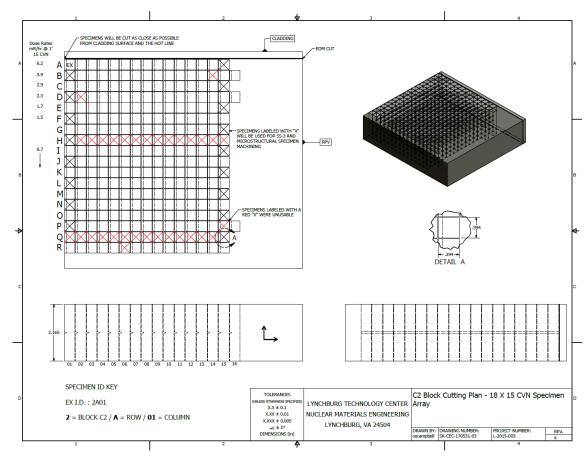


Figure 37. Block C2 cutting plan overview.

7.7.1.2 Chemical Composition / Microstructural / SS-3 Tensile Specimens

In Figure 37, specimens marked with a **black** "X," on alternating rows from the high fluence and low fluence sides were used to machine the SS-3 tensile specimens and coupons for microstructural specimens. Remnants from the coupon machining were used for chemical characterization. The detailed sectioning plan for the tensile and microstructural specimens is shown in Figure 38. Note that the SS-3 specimens were cut starting at the cladding face and slabbed off to thickness in the thickness direction of the vessel. The offal from profiling the SS-3 specimens was mounted and used for the chemical composition analysis. Lastly, the microstructural specimens were cut in a 2 x 2 array of 10 x 10 x 0.5 mm squares.

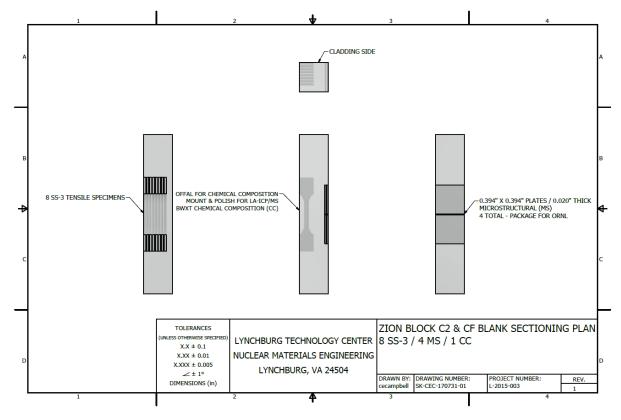


Figure 38. CVN blank cutting plan overview.

7.7.2 Specimen Identification

The traceability of each specimen to the original position within the block was paramount during this project. The table below outlines the labeling convention for each specimen type cut from block C2. An example of the sectioning and labeling of CVN blank 2B01 is shown below in Figure 39, note that the chemical composition specimens are not shown.

Table 7.7-2. Block C2 Specimen ID Definitions.

Specimen Type	Example ID	Definition
CVN	2A01	2 = Block C2 / A = row / 01 = column
SS-3	A1*	A = row / 1 = specimen closest to cladding
Microstructural (MS)	B1	B = row / 1 = arbitrary label of the 4 specimens
Chemical Composition (CC)	2A01	Replicated the CVN specimen it was cut from.

^{*}SS-3 specimens from the C2 block were labeled by row since only one CVN blank was consumed in each row.



Figure 39. CVN blank – 2B01. CVN blank cutting plan with labeled specimen example [17].

7.7.3 Specimen Dimension Verification (Appendix A)

As noted in the specimen matrix and shown in Figure 37, those CVN specimen blocks marked with a red "X" were rejected during the QA evaluation. Table 7.7-3 summarizes the machining errors and the corresponding resolution.

Table 7.7-3. Block C2 Specimen Rejection Overview.

Specimen/s	Error	Resolution	
2B14	Anomaly	NA	
2D02	Anomaly	NA	
2H02 – 2H15	Indicated on recast rather than block. Dimension w was systematically low	Brush off block to remove recast before running each layer	
2P15	EDM break down during cut.	NA	
2Q01 – 2Q14	Indicated on recast rather than block. Dimension w was systematically low	Brush off block to remove recast before running each layer	
2R06	Notch miss-cut	Put a stop in notching fixture to prevent contact.	

7.7.4 Activity & Dose Rates

During the packaging process, each row of 14 CVN specimens was measured for dose rate at 2" with the packaged Q Row specimens shown in Figure 40. Each bag contains 14 CVN, 4 microstructural, and 8 SS-3 tensile specimens. A gamma spectrum analysis was completed on the C Row chemical composition

specimen to determine the nuclides present. The only reportable nuclide was Co-60. Knowing these dose rates and that the only nuclide is Co-60 activity was calculated for the shipment.





Figure 40. Row Q CVN, tensile, and coupons specimen bagged for shipping [17].

Table 7.7-4. Block C2 Specimen Radiation Level.

Row ID – Bagged Group (14 CVNs)	Rad Level (mR/hr@2")
2A	122
2B	75
2C	54
2D	45
2E	30
2F	25
2G	20
2H	16
2I	14
2J	13
2K	11
2L	10
2M	8
2N	7
20	7
2P	7
2Q	6
2R	6

Note that the rad levels are only for the 14 CVN specimens, 10% contingency was added to the activity for the shipment to account for the microstructural and SS-3 tensile specimens.

7.8 BLOCK CF

The CF block was machined last due to the importance of the weld metal and since it was more complex because it was a hybrid of the two base metal machining plans discussed earlier with alternating rows of compact tension and CVN specimens. Moreover, two CVN blanks from each CVN row were machined

into SS-3, chemical, and microstructural specimens, as shown in Figure 44. However, unlike blocks F3 and F4, 0.4T compact tension specimens were machined from block CF such that 10 specimens would span the width of the block. During the cutting of the first several CVN row A blanks, there was an EDM program error that rendered 5 specimens untestable as CVNs. However, there was sufficient material to machine a set of nine mini-C(T)s. The quantity and type of specimens cut from block CF are outlined below in Table 7.8-1. The detailed drawings for each specimen are linked to the respective figures given in Section 7.4 and 7.8.1.2.

Table	7.8-1.	Block	CF	Specimen	Overview.

Туре	Quantity	Drawing
CVN	174	Figure 23
Microstructural (MS)	72	Figure 24
SS-3	142	Figure 25
Chemical Composition (CC)	18	Figure 38
0.4T	77	Figure 22
mini-C(T)	9	Figure 26
Total	492	-

7.8.1 Machining

7.8.1.1 Centering Weld

Block CF was machined differently than the rest of the blocks because the weld was not centered when it arrived. Once the cladding face was removed, a gross etch of the inner surface was performed to reveal the weld line, as shown in Figure 41.



Figure 41. Etched inner diameter with cladding removed. Note the highlighted void in the weld. See Figure 51 for more details [17].

To center the weld, the block was fastened to thee jack stands and leveled such that the weld was true to the table on the end mill. It was then milled until half a CVN width was to the center of the weld, as shown in Figure 42.

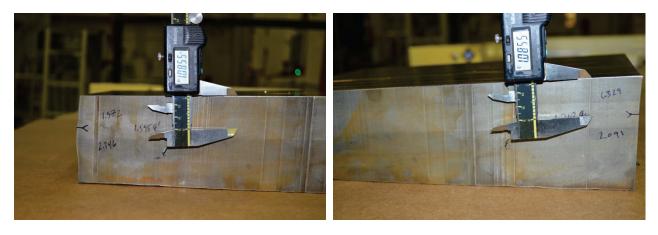


Figure 42. Partially milled CF block, showing centered weld on left and right edges of block [17].

To complete the centering of the weld, the block was flipped over on the freshly milled surface and milled to the final 2.165" thickness, placing the weld directly in the center of the block. The B Row slab, which was cut to machine 0.4T specimens, revealed the centered weld line as shown in Figure 43.

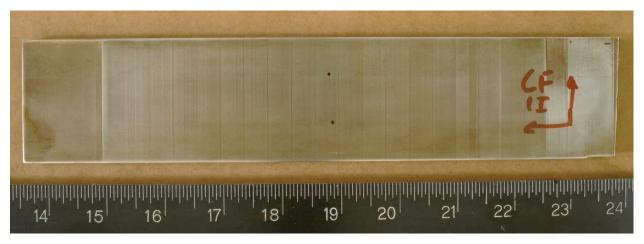


Figure 43. Row B slab cut (0.4 C(T)) illustrates the weld centerline of the CF Block [17].

7.8.1.2 CVN & 0.4T Compact Tension

After the weld was centered, machining proceeded using an EDM to cut 0.394" x 0.394" CVN blanks and 0.4" slabs for 0.4T specimens according to the cut plan. The specimen matrix is outlined in Figure 44.

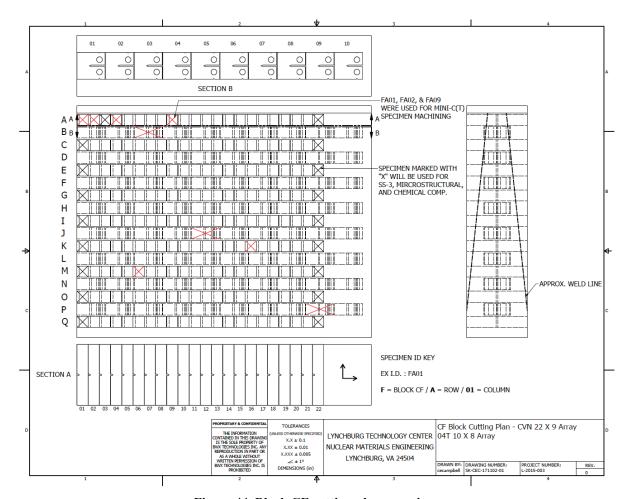


Figure 44. Block CF cutting plan overview.

(unlimited use by ORNL since drawing is not BWXT Proprietary)

The first several rows of 0.4T slabs were etched to ensure the weld did not travel outside of the centerline. The slabs from rows B through F are shown in Figure 45, where the weld is shown to be thicker than the 0.4T compact tension specimens.



Figure 45. (TOP) Row B slab | (MIDDLE) Row D slab | (BOTTOM) Row F slab [17].

The remnant from block CF below clearly shows the execution of the machining plan outline in Figure 46.

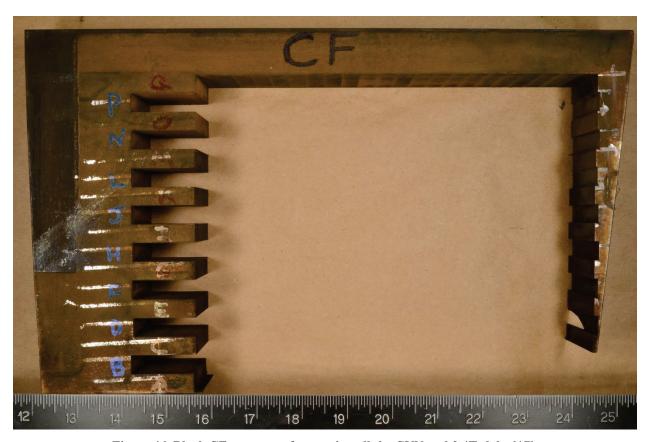


Figure 46. Block CF remnant after cutting all the CVN and 0.4T slabs [17].

7.8.1.3 Chemical Composition / Microstructural / SS-3 Tensile Specimens

Unlike block C2, each row of CVN specimens had two blanks removed to be machined into SS-3, chemical composition, and microstructural specimens. In Figure 44, the CVN blanks marked with a **black** "X" were selected to machine SS-3 tensile and coupons for microstructural specimens is shown in Figure 38. The offal from profiling the SS-3 specimens was mounted and used for the chemical composition analysis. Lastly, the coupons for microstructural specimens were cut in a 1 x 4 array of 10 x 10 x 0.5 mm squares to ensure they were taken from the weld as shown in Figure 47 rather than the 2x2 used in the base metal machining shown in Figure 38. The general specimen outline for the SS-3, chemical composition, and coupons from a CF CVN blank is shown in Figure 48.

Initially, the CVN blanks were etched as machining progressed into the block to ensure the weld traveled straight. Once the weld was shown to be thicker than the SS-3 tensile specimens etching the CVN blanks was discontinued. Figure 47 and Figure 48, show the cross section of block CF and the path of the fusion line in relation to the SS-3 and chemical composition specimens.

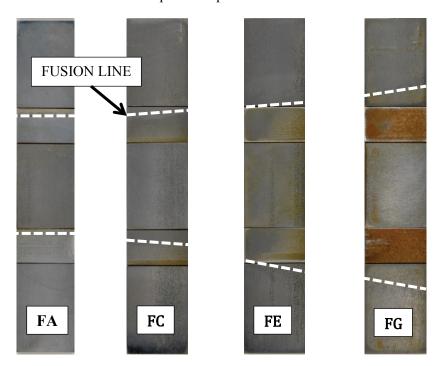


Figure 47. Side view of etched FA, FC, FE, and FG CVN blanks that were used to machine SS-3 & chemical composition specimens. Beginning with row G the entire SS-3 specimen was machined from weld [17].

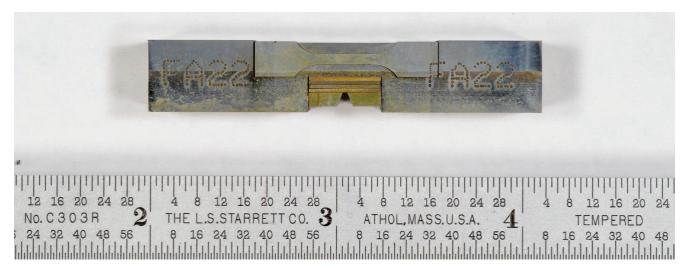


Figure 48. Charpy block FA22 had the smallest weld cross section for machining SS-3 and microstructural specimens. A 1x4 array of microstructural specimens was used to ensure they were taken from weld, rather than the 2x2 used in the base metal machining shown in Figure 38 [17].

7.8.1.4 Miniature Compact Tension

The miniature C(T) specimens cut from row A were retrieved from CVN blanks: FA01, FA02, and FA09. Due to the location of the wire burns, the only orientation that would allow for a full lot of nine machined specimens was in the radial direction. This is shown in Figure 49 and Figure 53, the labeling on all CVN specimens is on the cladding side, therefore the crack growth for the mini-C(T) specimens will be in the radial direction. The details of the specimen machining are described in Section 7.4.6.



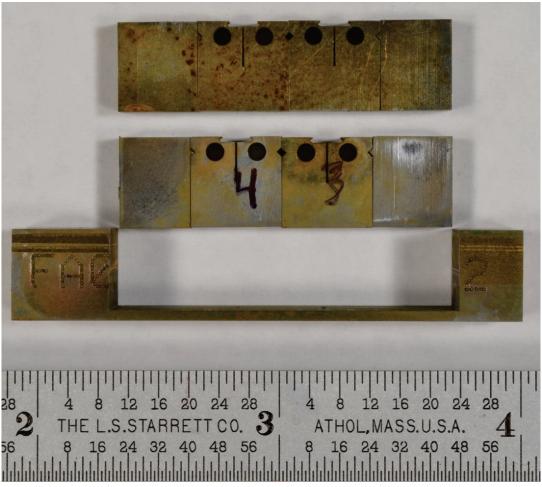


Figure 49. CVN blank FA02 – reconstructed mini-C(T) machining profile [17].

7.8.1.5 Weld Defects

While machining the weld metal block CF, several inclusions or voids were encountered. The first visible void was shown near the cladding surface in CVN specimen FA04. Attempts to machine through the void were unsuccessful because the non-conductive inclusion bent the EDM wire and did not allow it to charge. This anomaly is shown below in Figure 50.

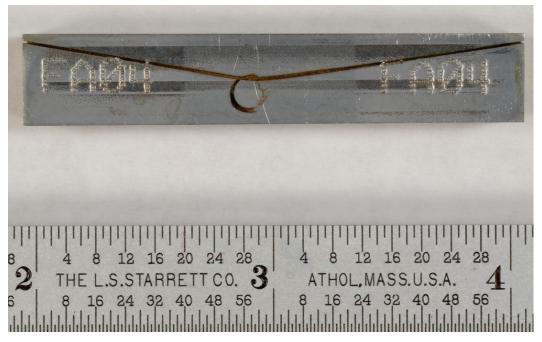


Figure 50. CVN blank FA04 showing weld void that caused EDM gap fault [17].

The next inclusion was found in row M, CVN specimen FM06. In order to retrieve the remaining specimens, FM06 was sacrificed and the wire moved around the inclusion. The inclusion piece was removed and photographed as shown in Figure 51.

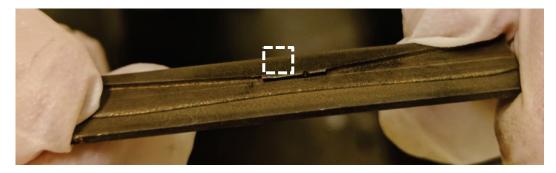


Figure 51. The EDM wire stuck an inclusion while cutting CVN specimen FM06. The wire was moved ~0.040" to avoid the inclusion and to remove it [17].

7.8.2 Specimen Identification

As previously noted, the traceability of each specimen to the original position within the block was paramount during this project. Table 7.8-2 outlines the labeling convention for each specimen type cut from block CF.

Table 7.8-2. Block CF Specimen ID Definitions.

Specimen Type	Example ID	Definition
CVN	FA01	F = Block CF / A = row / 01 = column
SS-3	A11*	A = row / 1 = cut from CVN 01 / 1 = specimen closest to cladding
55-5	A21	A = row / 2 = cut from CVN 22 / 1 = specimen closest to cladding
Microstructural (MS)	A11	A = row / 1 = cut from CVN 01 / 1 = arbitrary label of the 4 specimens
Microstructural (MS)	A21	A = row / 2 = cut from CVN 22 / 1 = arbitrary label of the 4 specimens
Chemical Composition (CC)	FA22	Replicated the CVN specimen it was cut from.
0.4T Compact Tension	FB01	F = Block CF / B = row / 01 = column
mini-C(T)	FA21	F = Block CF / A = row / 2 = column / 1 = arbitrary label of the # of specimens

^{*}SS-3, CC, MS specimens from row A were cut from FA03 due to FA01 being consumed for mini-C(T) specimens.

7.8.3 Specimen Dimension Verification

As noted on the specimen matrix in Figure 44, those CVN and 0.4T specimen marked with a red "X" were rejected during the QA process. Table 7.8-3 summarizes the machining errors and the corresponding resolution.

Table 7.8-3. Block CF Specimen Rejection Overview.

Specimen/s	Error	Resolution
FA01	Anomaly	Machine 3 mini-C(T) specimens
FA02	Anomaly	Machine 4 mini-C(T) specimens
FA03	Anomaly	Used for SS-3, CC, and MS specimens
FA04	Weld void	NA
FA09	Weld inclusion	Machine 2 mini-C(T) specimens
FK16	Angle cut on backside of specimen due to axis motor failure	Motor was replaced and specimen rejected.
FM06	Weld inclusion	NA
FB03	Cut after being parted off due to hanging up in the offal	Added a stop in the program 0.020" before completing the cut so a technician could receive the specimen as it was parted off.
FJ05	Anomaly, complete misalignment in the x axis and asymmetric profile.	Inspected EDM, could not find cause.
FP09	Wire contacts wore out, misaligning the specimen profile.	Contacts replaced.

In addition to the rejections noted above in Table 7.8-3, there were three additional specimens that had defects but may still produce valuable data. They are outlined in Figure 52.



(FH03)



(FH05)



(FJ07)

Figure 52. Specimen with defects: Specimen FH03 has two oblong holes due to an alignment error. Specimen FH05 has a burn in the top of the specimen due to offal getting caught and charged. Specimen FJ07 has a burn in the top of the specimen due to offal getting caught and charged [17].

7.8.3.1 Row A & B Reference

An overview of both CF rows A and B are shown reassembled as they would appear in the block is shown in Figure 53 for visual clarity and reference.

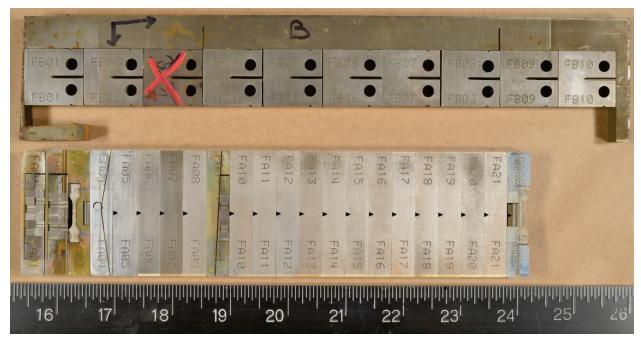


Figure 53. Block CF rows A & B overview: all the specimens that were machined and labeled from both rows were assembled as they came from the block [17].

7.8.4 Dose Rates

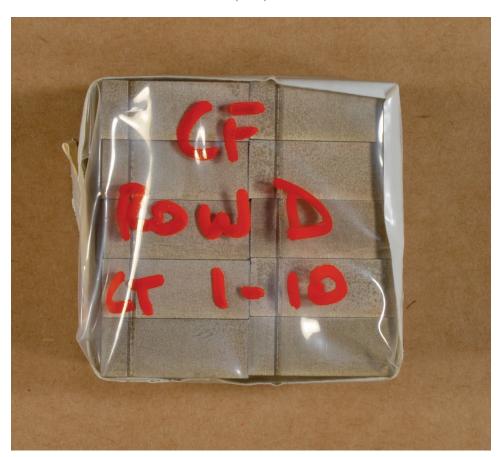
During the packaging process, each row of specimens was measured for dose rate at 2". A packaged row of each type was photographed and is shown in Figure 54 and the dose rate information recorded in Table 7.8-4.

Table 7.8-4. Block CF Specimen Radiation Level.

CV	N	0.4T Compact Tension		
Row ID – Bagged Groups	Rad Level (mR/hr@2")	Row ID – Bagged Groups	Rad Level (mR/hr@2")	
FA	112	FB	75	
FC	60	FD	32	
FE	32	FF	19	
FG	21	FH	13	
FI	15	FJ	9	
FK	12	FL	8	
FM	10	FN	6	
FO	10	FP	6	
FQ	9			



(TOP)



(BOTTOM)

Figure 54. Typical packaging for all specimens machined from block CF. (TOP) CVN, SS-3, coupons, and mini-C(T)s from row A. (BOTTOM) 0.4T compact tension row D [17].

7.9 CHEMICAL COMPOSITION

Laser Ablation Inductively Coupled Plasma Mass spectroscopy (LA-ICP-MS) for silicon, phosphorus, chromium, manganese, nickel, copper, and molybdenum was performed on samples that were mounted and ground with 600 grit sand paper. The ablation was performed using an ESI NWR213 laser ablation system coupled with a Nu Instruments ATTOM, magnetic sector ICP-MS. The samples were analyzed by first removing the oxide layer with a cleaning pass, followed by an analytical pass. Both ablations were performed at laser settings of 45%, 10HZ, 40u spot size, and 2u/sec line speed. The ICP-MS method employed was a deflector scan method using 2500 resolution. The elements were bracketed by three NIST standards: SRM 1134, SRM 1271, and SRM1762. Before each analytical run, the standards were ablated and collected to build the regression calibration curves.

The results of the analyzed specimen from base metal block C2 are shown in Table 7.9-1. The copper content ranged from 0.11 to 0.15 wt%. The second analysis was on the weld metal in block CF. Those results are reported in Table 7.9-2. The copper content roughly tripled from the content found in the base metal, ranging from 0.27 to 0.37 wt%. Table 7.9-3 lists NIST Standard Reference Material (SRM)-chemical composition results for comparison [18,19,20].

7.9.1 Base Metal (C2)

Table 7.9-1. Block C2 – Base Metal – Chemical Composition Results.

CUNIID		Chemical Composition (wt%)							
CVN I.D	Si	P	Cr	Mn	Ni	Cu	Mo		
2A15	0.29	0.007	0.11	1.36	0.44	0.12	0.44		
2B01	0.22	0.006	0.13	1.34	0.50	0.13	0.48		
2C15	0.26	0.008	0.10	1.31	0.46	0.11	0.46		
2D01	0.25	0.006	0.10	1.48	0.51	0.13	0.47		
2E15	0.21	0.016	0.10	1.34	0.53	0.14	0.47		
2F01	0.24	0.008	0.10	1.26	0.52	0.13	0.48		
2G15	0.24	0.008	0.10	1.27	0.46	0.11	0.47		
2H01	0.26	0.009	0.11	1.52	0.54	0.14	0.51		
2I15	0.22	0.006	0.09	1.28	0.49	0.12	0.47		
2J01	0.24	0.009	0.09	1.32	0.48	0.11	0.46		
2K15	0.30	0.010	0.12	1.39	0.58	0.16	0.53		
2L01	0.25	0.008	0.12	1.42	0.56	0.15	0.58		
2M15	0.29	0.010	0.10	1.41	0.51	0.12	0.51		
2N01	0.30	0.012	0.13	1.31	0.50	0.13	0.44		
2015	0.21	0.006	0.09	1.46	0.50	0.12	0.46		
2P01	0.25	0.009	0.10	1.34	0.51	0.12	0.54		
2Q15	0.20	0.006	0.13	1.38	0.52	0.13	0.47		

7.9.2 Weld Metal (CF)

Table 7.9-2. Block CF – Weld Metal – Chemical Composition Results.

CUNITO	Chemical Composition (wt%)						
CVN I.D. –	Si	P	Cr	Mn	Ni	Cu	Mo
FA03	0.66	0.017	0.10	1.59	0.58	0.37	0.41
FA22	0.68	0.018	0.10	1.42	0.55	0.34	0.43
FC01	0.59	0.016	0.08	1.35	0.53	0.34	0.34
FC22	0.64	0.016	0.09	1.59	0.58	0.37	0.38
FE01	0.66	0.018	0.08	1.49	0.57	0.34	0.37
FE22	0.58	0.015	0.07	1.47	0.48	0.27	0.34
FG01	0.63	0.016	0.08	1.43	0.50	0.33	0.33
FG22	0.57	0.019	0.07	1.51	0.54	0.32	0.35
FI01	0.58	0.017	0.06	1.57	0.51	0.28	0.34
FI22	0.68	0.017	0.10	1.62	0.54	0.32	0.39
FK01	0.68	0.019	0.10	1.49	0.54	0.35	0.39
FK22	0.69	0.020	0.09	1.66	0.55	0.33	0.39
FM01	0.63	0.019	0.06	1.65	0.57	0.37	0.38
FM22	0.67	0.020	0.06	1.66	0.59	0.35	0.38
FO01	0.70	0.015	0.10	1.34	0.52	0.36	0.38
FO22	0.61	0.017	0.07	1.47	0.51	0.35	0.37
FQ01	0.71	0.020	0.09	1.60	0.60	0.29	0.42
FQ22	0.59	0.018	0.06	1.47	0.55	0.27	0.32

7.9.3 Standards Verification

Table 7.9-3. NIST Standard Reference Material – Chemical Composition Results.

I.D.	Chemical Composition (wt%)							
I.D	Si	P	Cr	Mn	Ni	Cu	Mo	
SRM 1134	2.89	0.028	0.02	0.28	0.04	0.07	0.01	Standard
SKWI 1134	2.89	0.025	0.02	0.32	0.05	0.06	0.01	Run
SRM 1271	0.33	0.005	0.55	0.73	3.34	1.48	0.54	Standard
SKWI 12/1	0.36	0.006	0.55	0.68	3.34	1.48	0.54	Run
SRM 1762	0.35	0.035	0.92	1.91	1.16	0.12	0.35	Standard
SKWI 1702	0.33	0.036	0.93	1.92	1.14	0.13	0.35	Run

Based on the NIST standards used to calibrate the BWXT ICP-MS instrument [18,19,20], the elemental measurements were within the standard value with a deviation of 0.04%.

7.10 WASTE

BWXT disposed of low-level Class A (non-hazardous) process waste (gloves, paper, and plastic) according to established company procedures. BWXT also disposed of EDM filters and resins, small pieces of vessel offal, and chips associated with machining.

The large remnant pieces of RPV material, shown throughout the report, will be stored at BWXT for at least one year, and until the need for disposal is reached. Cladding was placed in appropriate waste streams at conclusion of the project.

7.11 MACHINING SUMMARY

Summary tables of the original Zion Unit 1 RPV specimen plan and the actual specimens machined by BWXT are shown in Table 7.11-1 and Table 7.11-2. It should be noted that the higher number of specimens was primarily due to two separate issues. First, the mini C(T) specimens were added to the plan to compensate for the damaged / non-conforming 0.5 C(T) specimens resulting from machining issues. Second, the through-wall chemical composition data was intended to be performed on one microstructural coupon from each of the 25 Charpy blocks obtained on alternating rows (through-wall) and maximum and minimum fluence locations (circumferential direction) of the C2 and CF blocks. However, to reduce shipping costs, the characterization was added to the BWXT contract in March 2017, and BWXT suggested using the offal or scrap from the Charpy block used for machining tensile and microstructural coupon specimen.

Table 7.11-1. Original Machined Specimens Plan.

Туре	F3	F4	C2	CF	TOTAL
CVN	-	-	239	180	419
Microstructural (MS)	-	-	64	72	136
SS-3	-	-	128	142	272
Chemical Composition (CC)	-	-			
0.4T	-	-	-	80	80
0.5T	56	56	-	-	112
mini-C(T)	0	0	-	0	0
PER BLOCK	56	56	431	474	1017

Table 7.11-2. Actual Machined Specimens.

Type	F3	F4	C2	CF	TOTAL
CVN	-	-	245	174	419
Microstructural (MS)	-	-	68	72	140
SS-3	-	-	134	142	276
Chemical Composition (CC)	-	-	17	18	35
0.4T	-	-	-	77	77
0.5T	48	56	-	-	102
mini-C(T)	28	20	-	9	57
PER BLOCK	76	74	464	492	1106

8. SUMMARY AND CONCLUSIONS

This report documents Phase 3 of the Zion RPV Harvesting Project: the machining of through-wall mechanical specimens (compact tension, tensile, Charpy V-notch), microstructural coupons for transmission electron microscopy, atom probe tomography, small angle neutron scattering, small angle x-ray scattering, and micro hardness, and chemical analysis specimens from the well-characterized beltline

weld [10 – 12] and base metal [13, 14] of the Zion Unit 1 RPV at BWXT, Lynchburg, VA. It also summarizes Phase 1 (harvested segments of the Zion Unit 1 RPV) and Phase 2 (cutting blocks from the Zion Unit 1 RPV ORNL Beltline Weld Segment 1) accomplishments.

This project is critically important because access to materials from active or decommissioned NPPs provide an invaluable resource for which there is limited operational data or experience to inform relicensing decisions and assessments of current degradation models to further develop the scientific basis for understanding and predicting long-term environmental degradation behavior and, therefore, a sound basis for informed aging management.

Specifically, data from RPV surveillance specimens containing similar WF-70 weld materials are available in the literature for a comparison of hardening and changes in fracture toughness and microstructure [10-12]. Similarly, data from surveillance specimens containing B7835-1 base metal plate material are available for a comparison of hardening and changes in fracture toughness [14]. Access to service-irradiated RPV welds and plate sections will allow through-wall attenuation studies to be performed, which will be used to assess current radiation damage models [4,5,6] and validate codes and standards.

9. REFERENCES

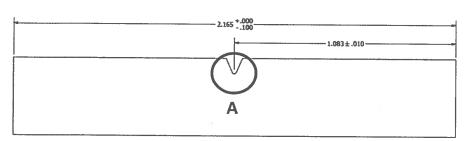
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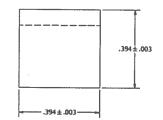
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- 14. Figure provided by B. Burgos, (2012). Westinghouse Electric Company
- 15. Figures provided by Energy Solutions
- 16. Figure provided by B. Hall, Westinghouse Electric Company, 2013
- 17. Figure provided by C. Campbell, BWXT, 2016, 2017, 2018.
- 18. NIST, Standard Reference Material (SRM) 1134, Low-Alloy, High-Silicon Steel
- 19. NIST, Standard Reference Material (SRM) 1271, Low-Alloy Steel, (Ni-Cr-Cu-Mo) (HSLA 100)
- 20. NIST, Standard Reference Material (SRM) 1762a, Low-Alloy Steel

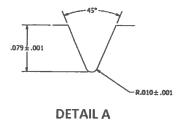


Appendix A: Specimen QA

Block C2







TOLERANCES (UNLESS OTHERWISE SPECIFIED) $X.X \pm 0.1$ $X.XX \pm 0.01$ $X.XXX \pm 0.005$ ∠ ± 1° **DIMENSIONS (in)**

Key: W = Width, H = Height

		AS	MACHINED	DIMENSIONS			
SPECIMEN I.D.	"2.165"	"1.083"	W "0.394"	H "0.394"	"0.079"	"45.0°"	"R0.010"
ZAOI	2.150	1.076	0.393	0,393	0.078	45.0	0.010
ZAUZ	2.156	1.076	0.394	0.343	0.078	415.0	0.010
2A03	2.156	1.076	0.394	0.393	0.078	45.0	0.010
2A04	2.156	1.074	0.393	0,393	0.078	45.0	0.010
2A05	2.157	1.077	0.393	0.393	0.078	45.0	0.010
2A06	2.157	1.077	0.393	0.393	0.078	45.0	0.010
2A07	2.156	1.076	0.343	0,393	0.078	45.0"	0.010
ZAOX	2.56	1.076	0.344	0.394	0.078	45.0'	0,010
2A09	2.154	1.076	0.393	0,393	0-078	45.0	0.010
ZAIO	2.156	1.076	0.393	0.397	0.078	45.0	0,010
2A11	2.157	1.677	0.393	0.393	0.078	45.0	0.010
ZAIZ	2.156	1.076	0.393	0.393	0.078	45.0°	0.010
2A13	2.150	1.076	0.393	0-393	0.078	4/5.0	0.010
2A14	2.156	1.076	0.393	G-393	0.078	45.00	0-010

Instrument:

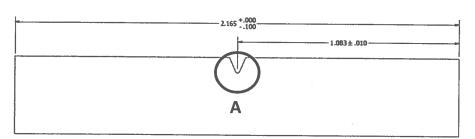
1-0000-7161 Instrument: 1-0000-1280 Inspector:

Cal Date:

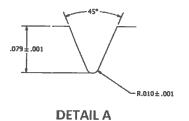
5-24-17 Cal Date: 5-24-17

Due Date:

J-24018 Due Date: 5-24-18 Date:
DIGITAL MIC OPTICAL COMPARATOR
0-6" MITUTOYO CCHERIX - TIMICA







TOLERANCES (UNLESS OTHERWISE SPECIFIED) $X.X \pm 0.1$ $X.XX \pm 0.01$ $X.XXX \pm 0.005$ ∠ ± 1° **DIMENSIONS** (in)

Key: W = Width, H = Height

			MACHINED	DIMENSIONS			
SPECIMEN I.D.	"2.165"	"1.083"	W "0.394"	H "0.394"	"0.079"	"45.0°"	"R0.010"
2807	2.156	1.076	0.394	0.397	ů. v78	45.0	0.010
2803	2.157	1.077	0.793	0.393	0.078	45.0	0.010
2304	2.156	1.076	0.333	0.393	0,078	45.0	0,010
2805	2.156	1.076	0,393	0.393	0.078	45.0"	0.010
SBOC	2.156	1.076	0.393	0.393	0.078	2/5.0	0.010
7807	2.156	1.076	0.394	0.393	0.078	45.0	0.016
2008	2.156	1.076	0.393	0.393	0.078	45.0	0.010
2809	2.157	1.077	0.393	0.393	0.078	45.0	0.010
2B10	2.157	1.077	0.394	0.393	0.078	75.0	0.010
2811	2.156	1.076	0.314	0.393	0.078	45.0	0.010
2817	2.157	1.077	0,393	0,393	0.078	45.0	0.010
5813	2.157	1.077	0.393	0.393	0.078	45.0"	0.010
2B14 To	2.157	1.077	.0,393	0.393	0.078	45:0"	0.010
2815	2.157	1.077	0.394	0.393	0.078	45.00	0.010

Instrument:

1-0000 - 7161 Instrument: 1-0000 - 1280 Inspector:

Cal Date:

- 5-24-17 Cal Date:

5-24-17

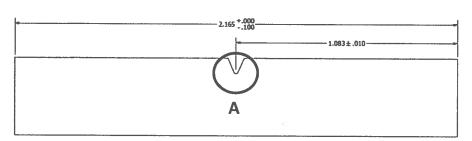
8-3-17

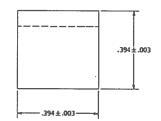
Due Date:

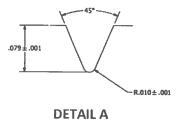
5-24-18 Due Date: 5-24-18 Date:

OFTICAL COMPARATOR CILLARD - TUMICA

DIGITAL MIL A-11 M. TITALIA







TOLERANCES
(UNLESS OTHERWISE SPECIFIED)

X.X \pm 0.1

X.XX \pm 0.01

X.XXX \pm 0.005 \angle \pm 1°

DIMENSIONS (in)

Key: W = Width, H = Height

	AS MACHINED DIMENSIONS									
SPECIMEN I.D.	"2.165"	"1.083"	W "0.394"	H "0.394"	"0.079"	"45.0°"	"R0.010"			
2002	2.157	1.677	0.394	0.397	0.078	45.0	0.010			
2003	2.157	1.077	0.393	0.393	0,078	45,00	0.010			
२८०५	2.156	1.076	0.393	0.393	0.078	45.0	0.010			
2005	2.156	1.076	0.394	0.393	0.078	45.0	0,010			
2006	7.156	1.074	0.397	0.393	0.078	215.0	0,010			
2007	2.156	1.076	0.394	0.394	0.078	45.0	0.016			
2008	2.154	1.076	0.393	0,394	0.078	45.00	0.010			
2009	2.156	1.076	0.393	0.393	0.078	45.0	0.010			
2010	2.157	1.077	0.393	0.393	0.078	45.0	0.010			
2011	7.154	1.076	0.394	0.393	0.078	45.0	0.016			
7017	7.156	1.076	0.393	0.393	0.078	45.0	0.010			
2013	2.156	1.076	0.393	0.343	0.078	i/5.0°	0.010			
2014	2.156	1.076	0.793	0.393	0.078	45.0	0.010			
2001	2.156	1.074	0.393	0.393	0.078	45.0°	0.010			
							27			

 Instrument:
 1-0000-7161
 Instrument:
 1-0000-1280
 Inspector:
 7-0000

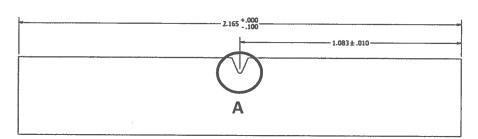
 Cal Date:
 5-24-17
 Cal Date:
 5-24-17
 7-280000

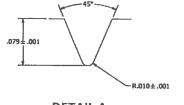
 Due Date:
 5-24-18
 Due Date:
 5-24-18
 Date:
 8-3-17

 DIGITAL MIC
 0PTICAL COMPARATOR
 0PTICAL COMPARATOR
 0PTICAL COMPARATOR

DIGITAL MIL OPTICAL COMPARATOR

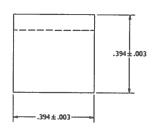
O-6" MITUTO YO (CLICOD - TIME)





DETAIL A

TOLERANCES
(UNLESS OTHERWISE SPECIFIED) $X.X \pm 0.1$ $X.XX \pm 0.01$ $X.XXX \pm 0.005$ $\angle \pm 1^{\circ}$ DIMENSIONS (in)



*- SPECIMEN NOTCHED
RESULTING IN TWO
DIFFCRENT WIDTH
MEASURMENTS.

Key: W = Width, H = Height

AS MACHINED DIMENSIONS									
SPECIMEN I.D.	"2.165"	"1.083"	W "0.394"	H "0.394"	"0.079"	"45.0°"	"R0.010"		
SPECIIVIEN I.D.	2.103	1.003		п 0.394	0.079	43.0	K0.010		
2002	2.157	1.077	374/394	0.393	0.079	45.0°	2010		
2003	7.157	1.077	0.393	0.393	0.079	45.0	0.010		
2004	2.157	1.077	0.393	0.393	0.079	45.00	0.010		
2005	2.156	1.076	0.393	0.393	0.079	45.0	0.010		
2006	2.157	1.077	0.393	0.393	0.079	45.0°	0.010		
2007	2.157	1.077	0.393	0.393	0.079	45.0	0.010		
2008	2.156	1.076	0.393	0.393	0.079	45.0	0.010		
2009	7.156	1.076	0.395	0.393	0.079	45.0	0.010		
5 DIO	2.156	1.076	0.395	0.393	0.079	45.0"	0.010		
2011	2.157	1.076	0.313	0,393	0.079	45,0	0.010		
2012	2.154	1.076	0,397	0.393	0-079	45.0°	0,010		
2013	7.156	1.076	0.393	0.343	0.079	45.0°	0.010		
2014	2.156	1.076	0.393	0.393	0.079	45.0	0,010		
2015	2.157	1.077	0,393	0.393	0.079	45.00	0.010		
2016	2.157	1.077	0.394	0.394	0.078	45.00	0.010		

Instrument: 1-0000 - 7161 Instrument: 1-0000 - 1280 Inspector:

5-24-17 Cal Date: 5-24-17

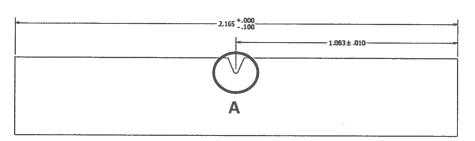
S-24-18 Due Date: 5-24-18 Date:
DIGITAL MIC OPTICAL COMPARATOR

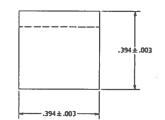
8-3-17

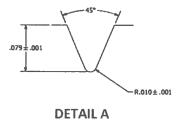
Due Date: S-24-18 Due
DIGITAL MIC

Cal Date:

CONTRAC COMPARATOR







TOLERANCES (UNLESS OTHERWISE SPECIFIED) $X.X \pm 0.1$ $X.XX \pm 0.01$ $X.XXX \pm 0.005$ ∠ ± 1° DIMENSIONS (in)

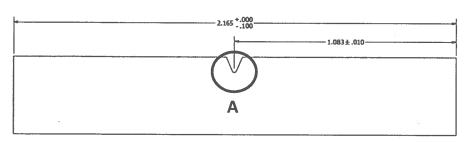
Key: W = Width, H = Height

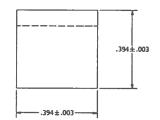
"			MACHINED I				
SPECIMEN I.D.	"2.165"	"1.083"	W "0.394"	H "0.394"	"0.079"	"45.0°"	"R0.010"
2801	2.156	1.076	0.394	0.394	0.080	45.0	0.010
2802	7.156	1-076	0.394	0.394	0,080	45.00	0.010
2803	7.157	1-077	0.395	0.394	0.080	45.6'	0,010
2804	2.157	1.077	0.393	0.394	0.080	45.0	0.010
26 02	2.157	1.077	0.394	0.394	0.080	45.0	0.010
2806	2.157	1.077	0.394	0.393	0.080	45.0	0.010
2807	7.156	1.076	0,394	0.394	0,086	45.0	0,010
7808	2.157	1.077	0.394	0.394	0.080	45.0"	0.010
2603	2.156	1.076	0.393	0.393	0.080	45.0	0.010
2 810	2.157	1.077	0.393	0.394	0.080	45.0	0.010
2811	2.157	1.077	0.394	0.394	0.080	45.0	0.010
2817	2.157	1.077	0.394	0.394	0.080	45.0	0.010
2813	2.157	1.077	0.394	0.394	0.086	45.0"	0.010
7814	7.157	1.677	0.394	0.294	0.080	45.0	0.010
				,			

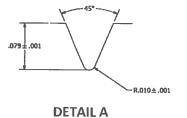
Instrument: 1-0000 - 7161 Instrument: 1-0000 - 1280 Inspector: Cal Date: 5-24-17 5-24-17 Cal Date: 8-3-17 Due Date:

5-24-14 Due Date: <u>5-24-18</u> Date: DIGITAL MIC OPTICAL COMPARATOR n-1-" .. -

.. - - 46 21. 2







TOLERANCES (UNLESS OTHERWISE SPECIFIED) $X.X \pm 0.1$ $X.XX \pm 0.01$ $X.XXX \pm 0.005$ ∠ ± 1° **DIMENSIONS (in)**

Key: W = Width, H = Height

	AS MACHINED DIMENSIONS									
SPECIMEN I.D.	"2.165"	"1.083"	W "0.394"	H "0.394"	"0.079"	"45.0°"	"R0.010"			
ZFOZ	2.155	1.075	v.393	0.393	0.080	45.0°	0,010			
2F03	7.155	1.075	0.393	0.393	0.080	45.0°	0.010			
2f04	2.155	1.075	0.393	0.393	0.080	45.00	0.010			
2F05	2.155	1.075	0.393	0,393	0.080	45.6	0,010			
7F06	2.155	1.075	0.393	0.393	0.080	45.00	0.010			
2fo7	2.155	1.075	0.394	0,393	0.080	45.0°	0.010			
2508	2.155	1.075	0.393	0.393	0.086	45.0	0.010			
2F09	2.155	1.075	0.395	0.393	0.080	45.0'	0.010			
z Ho	2.155	1.075	0.394	0.344	0.080	L15.0°	0.010			
2F11	2.155	1.075	0.393	0.393	0.080	45.0	0.010			
ZFIZ	7.155	1.075	0.394	0.394	0.080	45.00	0.010			
2F13	2.155	1.075	0.393	0.393	0.040	45.0°	0.010			
7F14	2.155	1.075	0.393	0.394	0.086	45.0	0.010			
2F15	2.155	1.075	0.393	0.397	0.080	45.00	0.010			
				40						

Instrument:

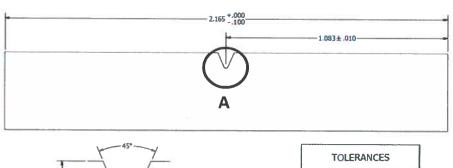
Cal Date:

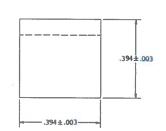
5-24-17 Cal Date: 5-24-17

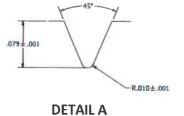
8-3-17

5-24-18 Due Date: 5-24-18 Date: Due Date: A-1" M.T. ...

OPTILAL COMPARATOR







(UNLESS OTHERWISE SPECIFIED) $X.X \pm 0.1$ $X.XX \pm 0.01$ $X.XXX \pm 0.005$ ∠ ± 1° **DIMENSIONS (in)**

Key: W = Width, H = Height

			MACHINED I				
SPECIMEN 1.D.	"2.165"	"1.083"	W "0.394"	H "0.394"	"0.079"	"45.0°"	"R0.010"
2601	2.157	1.077	0.394	6.393	0.080	4500	0.010
2602	2.157	1.077	0.393	0.394	0.080	45.0'	6.016
2603	2.156	1.076	0,393	0.393	0.080	45.0	0.010
2604	2.156	1.076	0.394	0.394	0,080	45.00	p.via
7605	7.157	1.077	0.393	0.394	0.080	45.0	0.010
2606	2.157	1.077	0.393	0.393	0.080	45.0	0.010
2607	2.158	1.078	0-394	0.394	0.080	45.0'	0.010
<u> </u>	2,157	1.077	0.344	0.344	0.080	45.0	0.010
2609	7.156	1.076	0.394	0.344	0.080	450	0.010
2610	2.156	1.076	0.397	0,394	0.080	45.0"	0.010
2611	2.157	1.077	0.394	0,394	0.080	45.0	0.010
7612	2.157	1.077	0.393	0.393	0.0%	45.0	0.010
2613	2.157	1.077	0,384	0.394	0.080	45.0	0.010
2614	2.157	1.077	0.397	0.394	0.080	45.0'	0.010

1-0000-7161 Instrument: 1-0000-1280 Inspector: Instrument:

Cal Date:

Due Date:

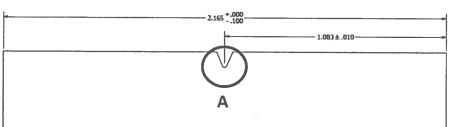
5-24-17 Cal Date: 5-24-17

5-24-18 Due Date: 5-24-18 Date:

DIGITAL MIL OPTICAL COMPARATOR n- 6" MITHTOUR

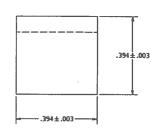
(1417) - + 11A

8-3-17





DETAIL A



* - MEASURMENT OUT OF TOLERANCE

Kev: W = Width, H = Height

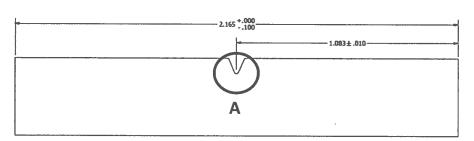
DIMENSIONS (in)

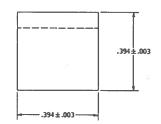
Key: W = Width, H = Height									
			MACHINED	DIMENSIONS					
SPECIMEN I.D.	"2.165"	"1.083"	W "0.394"	H "0.394"	"0.079"	"45.0°"	"R0.010"		
2402	7.157	1.077	0.381	0.394	0.080	45.0'	0.010		
2403	2.158	1.078	0.382	0.392	0.080	45.0	0.010		
2404	2.157	1.077	0.381*	0.394	0.080	45.00	0,010		
ZH 05	7.156	1.076	0.382	0.393	0,080	45.0	0.010		
2406	2.156	1.076	0.382	0.391	0.080	45.0	0.010		
21107	7.157	1.077	0.381	0394	0.080	45.0'	0,010		
2408	7-157	1.077	6.382	0.394	0.080	45.0	0.010		
2409	2.157	1.077	0.381	0.393	0,080	45.00	0.010		
2410	2.156	1.076	0.381*	0.392	0.080	45.0	0.010		
2411	2.157	1.077	0.382*	0.394	0.080	45.0'	0,010		
214 12	7.158	1.078	0.381	0.394	0.080	45.00	0-010		
2H 13	7.156	1,076	0.381*	0.393	0.080	45.0	0-010		
2414	2.156	. 1.076	0.381	0.394	0.080	45.00	0.010		
7H15	2.157	1.077	0.381	0.394	0,080	45.0°	0.010		
		*2							

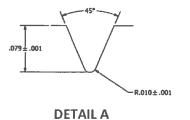
Instrument: Instrument: 1-0000-12% Inspector: 1-0000-7161 T. CIZOCOM 5-24-17 Cal Date: Cal Date: 5-24-17 8-7-17

5-24-18 5-24-18 Due Date: Due Date: DIGITAL MIC OPTICAL COMPARATOR

COUCTO TIME ON







TOLERANCES (UNLESS OTHERWISE SPECIFIED) $X.X \pm 0.1$ $X.XX \pm 0.01$ $X.XXX \pm 0.005$ ∠ ± 1° **DIMENSIONS** (in)

Key: W = Width, H = Height

			MACHINED I	DIMENSIONS			
SPECIMEN I.D.	"2.165"	"1.083"	W "0.394"	H "0.394"	"0.079"	"45.0°"	"R0.010"
1012	2.156	1.076	0.394	0.394	0.074	45.0	0.010
2102	7-156	1.076	0.393	0.394	0.079	45.0	0.010
2103	2.154	1.076	0.394	0.394	0.079	45.0	0.010
2704	2.155	1.075	0.393	0.313	0.079	45.0	0,010
2105	2.157	1.677	0.394	0.394	0.079	45.0	0.010
2100	2.156	1.076	0.394	0-394	0.079	45.0	0.010
2107	2.157	1.077	0.393	0.394	0,079	45.0	0.010
2108	7.156	1.076	6.394	0.393	0.079	45.0	0.010
2509	2.157	1.077	0.393	0.393	0.079	45.0	0.010
7110	2.157	1.077	0.394	0.394	0.079	45.0	0.010
211(2.157	1.077	0.394	0.394	0.079	45.00	0.010
2112	7.156	1.076	0.393	0.394	0.079	45.00	0.010
2113	2.154	1.076	0.343	0.394	0.079	4500	0.010
7114	7.156	1.076	0.394	0.394	0,079	45.00	0.010

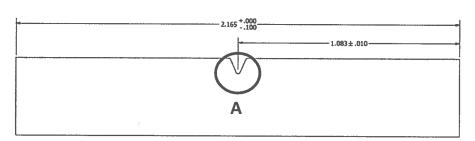
Instrument: 1-0000-7161 Instrument: 1-0000-1280 Inspector:

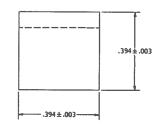
Cal Date: Cal Date:

Due Date:

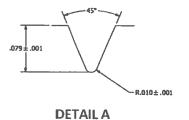
5-24-18 DIGITAL MIL O-6" MITUTAYA Due Date: 5-24-18 OPTICAL COMPARATOR

SCHERR - Tumille





8-2-17



TOLERANCES (UNLESS OTHERWISE SPECIFIED) $X.X \pm 0.1$ $X.XX \pm 0.01$ $X.XXX \pm 0.005$ ∠ ± 1° **DIMENSIONS (in)**

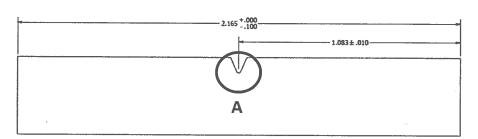
Key: W = Width, H = Height

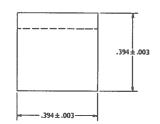
			MACHINED I	DIMENSIONS			
SPECIMEN I.D.	"2.165"	"1.083"	W "0.394"	H "0.394"	"0.079"	"45.0°"	"R0.010"
2502	2.157	1.077	0.394	0.394	0.080	45.0°	0.010
2503	2.157	1.077	U.393	0.393	0.080	45.00	0.010
2504	2.157	1.077	0.394	0.394	0,080	45.0	0,010
2505	7.154	1.076	0.394	0.394	0.080	45.00	0.010
2506	2.157	1,077	6.393	0.393	0.080	45.00	0.010
2507	2.154	1.076	0.394	0,393	0.080	45.00	0.010
2508	2.15%	1.074	0.394	0.394	0.080	45.0	0.010
2509	2.158	1.078	0.391	0.393	0.080	45.0	0.010
2510	2.156	1.076	0.394	0.394	0.080	45.0	0.010
2511	2.156	1.076	0.393	0.394	0.080	45.0	0.010
2712	2.156	1.076	0.394	0.394	0.080	45.0°	0.010
2513	2.157	1.077	0.394	0.393	0.080	45.0°	0.010
2514	2,157	1.077	0.344	0.344	0.080	45.0	0.010
2515	2.156	1.074	0.394	0.393	0.080	45.0	0.010

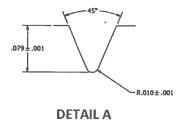
Instrument: <u>| | 1 - 0000 - 716 | Instrument: | 1 - 0000 - 1280 | Inspector:</u> 5-24-17 Cal Date: 5-24-17 Cal Date:

5-24-18 Due Date: 5-24-18 Date:
DIGITAL MIC OPTILAL COMPARATOR Due Date:

SCH122 -







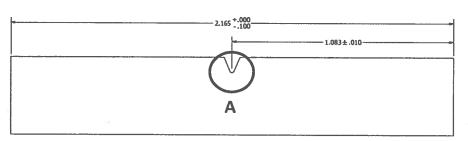
TOLERANCES
(UNLESS OTHERWISE SPECIFIED) $X.X \pm 0.1$ $X.XX \pm 0.01$ $X.XXX \pm 0.005$ $\angle \pm 1^{\circ}$ DIMENSIONS (in)

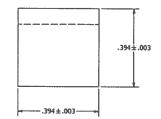
Key: W = Width, H = Height

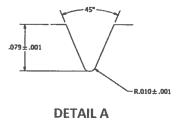
		AS	MACHINED	DIMENSIONS			
SPECIMEN I.D.	"2.165"	"1.083"	W "0.394"	H "0.394"	"0.079"	"45.0°"	"R0.010"
7K01	2.155	1.075	0.391	0.393	6.080	45.0	0.010
2KOZ	7.156	1.076	0.392	0.393	0.080	45.00	0.010
21603	2.155	1.075	0.391	0.397	0.080	45.00	0.010
21604	2.155	1.075	0.391	0.392	0.080	45.0	0.010
21105	2.156	1.076	0.393	0.393	0.080	45.0	0.010
2106	2.157	1.077	0.393	0.392	0.080	45.00	0,010
21607	2.156	1.076	0,391	0.391	0.0%0	45.00	0.010
2K0X	7.156	1.076	0.391	0.391	0.080	45.0	0.010
21609	2.157	1.077	0.392	0.392	0.080	45.0°	0.010
2K10	2.156	1.076	0.392	0392	0,080	45.00	0.010
21411	2.156	1.076	0.391	0.391	0.080	45.00	0.010
2K12	2.156	1.076	0.397	0.392	0.080	45.0	0.011)
2K13	2.154	1.076	0.391	0.391	0.080	45.0"	0.010
21414	2.156	1.076	0.392	0.392	0.080	45.0	0.010
,				×4			

Instrument:	1-0000-7161	Instrument: _	1-0000-1780	Inspector:	7.30
Cal Date:	5-24-17	Cal Date:	5-24-17		T. Colocon
Due Date:	5. 24-10	— Due Date: —	5-74-18	— Date:	8-2-17

DIGITAL MIL OFTICAL COMPARTION







TOLERANCES (UNLESS OTHERWISE SPECIFIED) $X.X \pm 0.1$ $X.XX \pm 0.01$ $X.XXX \pm 0.005$ ∠ ± 1° **DIMENSIONS (in)**

Key: W = Width, H = Height

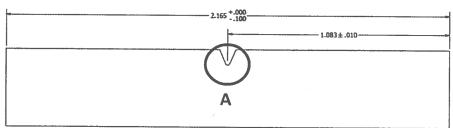
AS MACHINED DIMENSIONS										
SPECIMEN I.D.	"2.165"	"1.083"	W "0.394"	H "0.394"	"0.079"	"45.0°"	"R0.010"			
2602	2.156	1.076	0.394	0.394	0.079	45,0	0.010			
7403	2.156	7 1.076 2.0	0.393	6.394	0.079	45.0	0.010			
2204	2.156	1.076	0.394	0,394	0.079	45.00	0.010			
2205	2.156	1.076	0.393	0,394	0.079	45,0"	0.010			
2706	2.157	1.077	0.394	0.394	0.079	45.0°	0.010			
2107	2.156	1.076	0.344	0.394	0,079	45.0	0.010			
2208	2.158	1.078	0.393	0.393	0.079	45.0	0.010			
2409	2.156	1.076	0.394	0,384	0.079	45.0	0,010			
2110	2.156	1.076	0.394	0.394	0.079	45.0	0.010			
ZL11	2.156	1.076	0.394	0.394	0.080	45.0	0.010			
2112	2.156	1.076	0.394	0.394	0.079	45.00	0.010			
2L13	2.157	1.077	0.394	0.394	0.079	45.00	0.010			
2614	2.156	1.076	0.394	0.394	0.079	45.00	0.010			
2115	2.154	1,07(,	0.394	0.394	0.079	45.00	0.010			
		,								

Instrument:	1-0000-7161	Instrument: _	1-0000-1280	Inspector:	7.70
Cal Date:	5-24-17	Cal Date:	5-24-17	_	T. CROOM
	- 34 14		£ 211 .C.		~ - 17

5-24-18 Due Date: 5-24-18 Date: 8-2-17

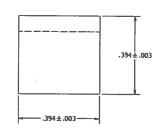
DIGITAL MIL OFTICAS COMPARATOR

O-6" mititalia SCHERRA Tumica Due Date:





DETAIL A



8-2-17

Key: W = Width, H = Height

DIMENSIONS (in)

AS MACHINED DIMENSIONS										
SPECIMEN I.D.	"2.165"	"1.083"	W "0.394"	H "0.394"	"0.079"	"45.0°"	"R0.010"			
2m01	2.156	1.076	0.394	0.393	0.079	45.0	0.010			
2m oz	2.157	1.077	0.394	0.393	0.079	45.0	0.010			
2 m o 3	2.158	1.078	0.394	0.394	0.079	45.00	0.010			
2m04	2.156	1.076	0.394	0,394	0.079	45.0	0.010			
2mos	2.156	1.076	0.393	0.393	0.079	45.0	0.010			
2m06	2.156	1.076	0.394	0.394	0.079	45.0	0.010			
2m07	2.156	1.076	0.394	0.394	0.079	45.0	0.010			
lmox	7.156	1.076	0.394	0.393	0,079	45.00	0,010			
2m09	2.158	1.078	0.394	0,394	0.079	45.0	0.010			
2m10	2.158	1.078	.0.393	0.393	0.079	45.0	0.010			
ZMII	2.156	1.076	0.394	0.394	0.079	45.0	0.010			
2112	2.154	1.076	0.394	0.394	0.079	45.00	0.010			
zmi3	2.156	1.076	0.394	0.394	0.079	45.0	0.010			
2m14	2.156	1.076	0.394	0.394	0.079	45.0	0.010			
- Te				,						

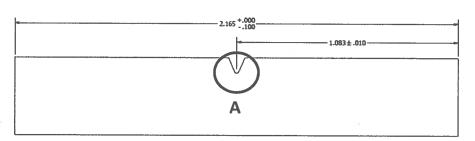
Instrument: 1-0000 - 7141 Instrument: 1-0000 - 1180 Inspector: 7. Circom

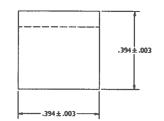
Cal Date: 5-24-17 Cal Date: 5-24-17

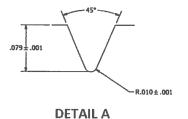
Due Date: 5-24-18 Due Date: 5-24-18 Date:

DIGITAL MIC OFTICAL COMPARATOR

SCHERR-TUMICO







TOLERANCES (UNLESS OTHERWISE SPECIFIED) $X.X \pm 0.1$ $X.XX \pm 0.01$ $X.XXX \pm 0.005$ ∠ ± 1° **DIMENSIONS (in)**

Key: W = Width, H = Height

AS MACHINED DIMENSIONS									
SPECIMEN I.D.	"2.165"	"1.083"	W "0.394"	H "0.394"	"0.079"	"45.0°"	"R0.010"		
2N01									
2N 0 2	2.157	1.076	0.393	0.393	0,079	45.00	0.010		
5N03	7.157	1.076	0.393	0.393	0.079	45.0°	0.010		
2104	2.157	1.076	0.393	0.393	0.079		0.010		
2N 05	2.156	1.076	0.393	0.393	0.078	45.0°	0.010		
5406	2.158	1.077	0.397	0.393	0.078	45.00	0.010		
2207	2.158	1.076	0.393	0.394	0.078	45.00	0.010		
2408	2.155	1.077	0.343	0.394	0.078	45.0°	0.010		
2409	2.160	1.077	0.344	0.394	0.078	45.00	0.010		
2410	2.158	1.076	0.393	0.394	0078	45.00	0.010		
5411	2.157	1.076	0.393	0.393	0.078	45.0°	0.010		
2N 12	2.159	1.077	0.393	0.394	אדעט		0.010		
ZN 13	2.159	1.077	0.394	0.394	0.078	45.00	0.010		
2N14	2.158	1.076	0.393	0.393	0.078	,,	0.010		
2 N 15	2.157	1.076	0.393	0.394	0.078	45.00	0010		

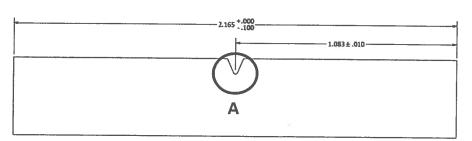
1-0000-7161 Instrument: 1-0000-1280 Inspector: Instrument: 5-24-17 Cal Date: 5-24-17 Cal Date:

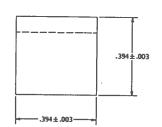
8-2-17

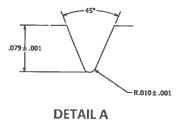
5-24-18 Due Date: 5-24-18 Date: DIGITAL MIG OPTICAL COMPARATOR Due Date:

SCHEDA - TUMICA

N= (1) MITHININ







TOLERANCES (UNLESS OTHERWISE SPECIFIED) $X.X \pm 0.1$ $X.XX \pm 0.01$ $X.XXX \pm 0.005$ ∠ ± 1° **DIMENSIONS (in)**

Key: W = Width, H = Height

AS MACHINED DIMENSIONS										
SPECIMEN I.D.	"2.165"	"1.083"	W "0.394"	H "0.394"	"0.079"	"45.0°"	"R0.010"			
2001	2,157	1.076	0.393	0.397	0080	45.0"	0.010			
2002	2.158	1.077	0.394	0.394	0.080	45.00	0.010			
2003	7,158	1.077	0.397	0,394	0080	45.0°	0.010			
2004	2.158	1.077	0.394	0.394	0,080	45,0	0.010			
2005	7.157	1.076	0.394	0.394	0.080	45.0	0.010			
2006	2,158	1.077	0.393	0.393	0,080	45.0°	0.010			
2007	2.158	1.077	0.393	0,393	0.080	45.0°	0.010			
7008	2.158	1-077	0.393	0.394	0.080	45.00	0.010			
2009	2.157	1.076	0.393	0.394	0.080	45.00	0.016			
2010	2:128	1.076	0.394	0,394	0.080	45.0	0.010			
1102	7.157	1.076	0.394	0.394	0.080	45.0	0.010			
2012	7.157	1.076	0.393	0.393	0280		0.010			
2013	2,157	1.076	0.394	0.394	0.080	. ,	0.00			
2014	2.158	1.077	0.394	0.394	0.080		2010			
	Q.									

Instrument:

1-0000-7161 Instrument: 1-0000-1780 Inspector:

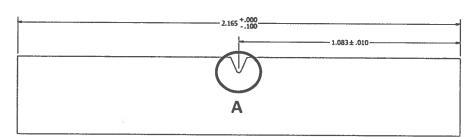
Cal Date:

5-24-17 Cal Date: 5-24-17

Due Date:

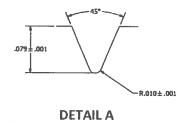
J-24-18 Due Date: 5-24-18 Date:
D. 6. TAL MIL OATICAL COMPARATOR

8-2-17





8-16-17



TOLERANCES (UNLESS OTHERWISE SPECIFIED) $X.X \pm 0.1$ $X.XX \pm 0.01$ $X.XXX \pm 0.005$ ∠ ± 1° **DIMENSIONS (in)**

Key: W = Width, H = Height

AS MACHINED DIMENSIONS									
SPECIMEN I.D.	"2.165"	"1.083"	W "0.394"	H "0.394"	"0.079"	"45.0°"	"R0.010"		
2Poz	7.158	1.078	0.394	0.394	0.078	45.00	0.010		
2P03	2.158	1.078	0.394	0.394	0.078	45.00	0.010		
204	7.158	1.078	0.394	0.394	0.078	45.0'	0.010		
2205	2.158	1.078	0.394	0.394	0.078	45.0	0,010		
2706	2.158	1.078	0.394	0.394	0.078	45.00	0,010		
2707	2.158	1.078	0.394	0.394	0.078	45.0°	0.010		
ZP08	2.158	1.678	0.394	0.394	0.078	45.00	0.018		
2709	2.158	1.078	0.344	0.394	0.078	45.0'	0.010		
7 A0	2.158	1.078	0.394	0.394	0.078	45,0°	0.010		
2711	2.158	1.078	0.394	0.344	0.078	45.0	0.010		
2195	2.158	1.078	0.394	0.394	0.078	45.0	0.010		
2913	2.158	1.078	0,394	0.394	0.078	45.0	0.010		
2714	2.158	1.078	0.394	0.394	0.078	45.0	0.010		
2716	2.158	1.078	0.394	0.344	0.078	45.0"	0.010		

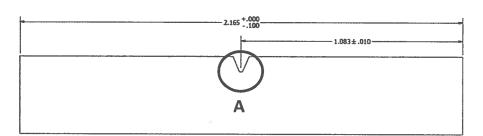
Instrument: Instrument: 1-000-1280 Inspector: 1-0000-7161

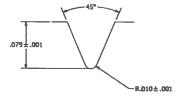
Cal Date: 5-24-17 5-24-17 Cal Date:

5-24-18 5-24-18
OFTICAL COMPARATOR Due Date: Due Date: Date:

0-6" ----

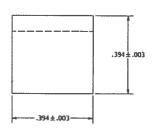
Schroa - Tumica





DETAIL A

TOLERANCES (UNLESS OTHERWISE SPECIFIED) $X.X \pm 0.1$ $X.XX \pm 0.01$ $X.XXX \pm 0.005$ ∠ ± 1° DIMENSIONS (in)



+ . WIDTH OUT OF TOLERANCE PEZ SPECIFICATION

Key:	W =	Width,	H =	Height
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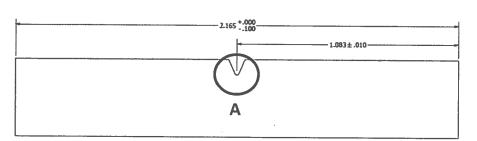
AS MACHINED DIMENSIONS										
SPECIMEN I.D.	"2.165"	"1.083"	W "0.394"	H "0.394"	"0.079"	"45.0°"	"R0.010"			
7001	7.158	1.078	6.386	6.394	0.079	45.00	0.010			
2002	7.158	1.078	0.384	0.344	0.079	45.0°	0.010			
2003	7.158	1.078	0.386	0.394	0.079	45.00	0.010			
2004	7.158	1.078	0.386	0.394	0.079	45.0"	0.010			
2005	2.158	1.078	0.384	0.394	0.079	4500	0.010			
2006	2.158	1.078	0.386	0.394	0.079	45.0°	0.610			
2007	2.158	1.078	0.386	0.394	0.079	45.0	0.010			
7008	2.158	1.078	0.385	0.394	0.079	45.0°	0.010			
2009	7.158	1.078	0.385	0.394	0.079	45,00	0.010			
2010	7.158	1.078	0.386	0.394	0.079	45.0°	0.010			
2011	2,158	1.078	0.386	0.394	0.079	45.00	0.010			
2017	2.158	1.078	0.386	0.394	0.079	45.0	0.010			
2213	2.158	1,078	0.386	0.394	0.079	45.0°	0.010			
2014	2.158	1.078	0.384	0.344	0.079	45.00	0.010			

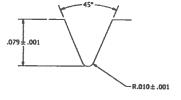
Instrument:	1-0000-7161	Instrument:	1-0000-1250	Inspector:	73- Tichavan
Cal Date:	5-24-17	Cal Date:	5-24-17	_	

5-24-18 Due Date: 5-24-18 Date: 8-16-17

AIGITAL MIC

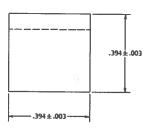
O-6" MITUTOY6 SCHEEL- TUMICAL Due Date:





DETAIL A

TOLERANCES (UNLESS OTHERWISE SPECIFIED) $X.X \pm 0.1$ $X.XX \pm 0.01$ $X.XXX \pm 0.005$ ∠ ± 1° **DIMENSIONS (in)**



4-16-17

K-HEIGHT OUT OF SPECIFICATION DUC TO SPECIMEN BEING NOTCHED

Key: W	= Width,	H = Height
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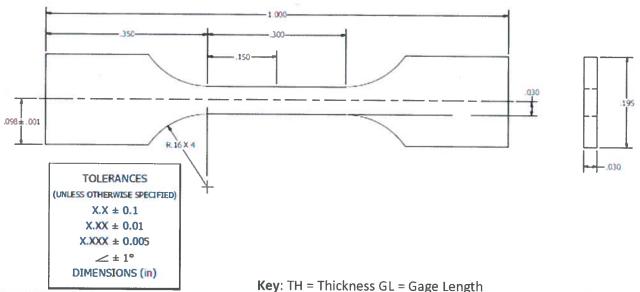
AS MACHINED DIMENSIONS										
SPECIMEN I.D.	"2.165"	"1.083"	W "0.394"	H "0.394"	"0.079"	"45.0°"	"R0.010"			
7201	2.158	1.078	0.395	0.395	0.080	45.0	0.010			
2025	7.158	1.078	0.395	0.395	6.080	45.00	0.010			
2203	2.158	1.078	0.395	0,395	0.080	45.0'	0,010			
2204	2.158	1.074	0.395	0.395	0.080	45.0	0.010			
2205	2.158	1.078	0.395	0.395	0.080	45.0	0.010			
7.ROG	2.158	1.078	0.395	0.395	0.080	45.0	0.010			
2R07	7.158	1.078	0.3%	0.395	0.080	45.0	0.610			
८२०४	2.158	1.078	0.395	0.395	0.080	45.0	0.010			
2209	2.158	1.078	0.395	0.395	0.080	450	0.010			
2210	2,158	1.078	0.395	a.345	0.080	45.0	0.010			
2211	2.158	1.078	0.345	0.395	0.080	45.0	0.010			
2812	2.158	1.078	0.395	0.395	0.080	45.0	0.010			
2813	2.158	1.078	0,395	0.395	0.080	45.00	0.010			
2214	2.158	1,078	0.395	0.395	0.080	45.0	0.010			
2215	2.158	1.078	0,345	0.395	0.080	45.00	0.010			

Instrument: 1-0000-761 Instrument: 1-0000-1280 Inspector: Cal Date: 5-24-17 Cal Date: 5-24-17

5-24-18 5-24-18 OPTICAL COMPARATOR Due Date: Due Date: Date:

DIGITAL MIL O-1." MITUTOYA

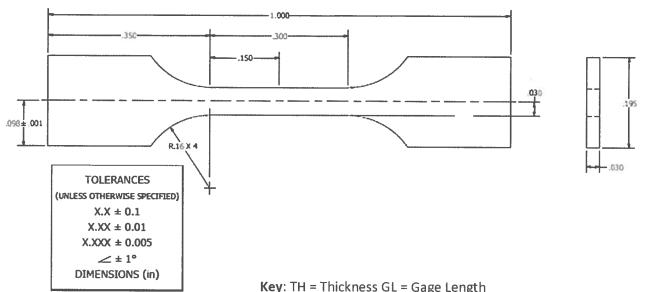
SCHELL - Tumico



Rey. III – IIIIckness GL – Gage Lengtii										
				NED DIMENS	SIONS					
SPECIMEN I.D.	"1.00"	"0.195"	"0.350"	"0.300"	"RO	.16"	GL "0.060"	TH "0.030"		
					0.16	0.16				
2A 15 1	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0.030		
					0.16	0.16				
2	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0. 039		
	,				0.16	0.16]			
3	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0.630		
1,1	,				0.16	0.16				
1	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0.030		
_			4.35		0.16	0.16				
	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0.030		
6					0.16	0.14				
6	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0.630		
		0.05			0.16	6.16	<u> </u>			
	1.00	0.195	0.350	0.300	6,16	0.16	0.058	0.030		
8					0.16	0.16	1			
D	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0.030		
			8] [
- F		į.								
								u = 0 =		

Instrument: Instrument: 1-0000 - 1280 Inspector: 1-0000-7161 Cal Date: Cal Date: 5-24-17 5-24-17 Due Date: 5-24-18 Due Date: Date: 5-24-18 8-16-17 DIGITAL MIL
0-6" MITUTOYO BITICAL COMPARATOR

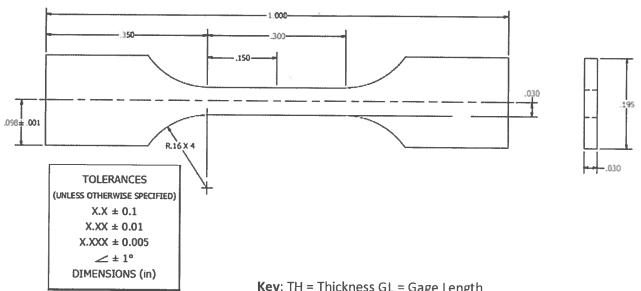
SCHERR - Tumico



		I/G	y. In = Inick	Hess Gr - Ga	ge rengtii			
			AS MACHII	NED DIMENS	IONS		·	
SPECIMEN I.D.	"1.00"	"0.195"	"0.350"	"0.300"	"RC).16"	GL "0.060"	TH "0.030"
					0.16	0.16		
2B01 1	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0.030
					0.16	0.16		
2	1.00	0.195	0.350	0.306	0.16	0.16	0.058	0.030
					0.16	0.16		
3.	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0.030
					0.14	0.16		
4	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0.030
					0.16	0.16	」 . ∣	
5	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0.030
					0.16	0.16		
6	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0.036
		~.~			0.16	0.16	_	
7	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0.030
10			,		0.16	0.16		
8	1.00	0.195	0.350	0.300	0.16	0.14	0.058	0.030
]	
9.								
							_	

T. croom Inspector: Instrument: Instrument: 1-0000 - (280 1-0000 - 7141 Cal Date: Cal Date: 5-24-17 _ 5-24-17 Due Date: 5-24-18 Due Date: 8-16-17 Date: 5-24-18 DIGITAL MIC OFTICAL COMPARATOR O-6" MITUTOYO SCHERR - TUMICO

Zion SS3 Specimen



		Ke	y: TH = Thick	ness GL = Ga	ge Length			
			AS MACHI	NED DIMENS	IONS			
SPECIMEN I.D.	"1.00"	"0.195"	"0.350"	"0.300"	"RC	0.16"	GL "0.060"	TH "0.030"
					0.16	0.16		
2615-1	1.00	0.198	0.350	0.300	0.14	0.14	0.059	0.030
					0.16	0.16		
2	1.00	0.198	0.350	0.300	0.16	0.16	0.059	0.030
					0.16	0.16		
3	1.00	0.198	0.356	0.300	0.16	0.16	0.059	0.030
4			3.5.		0.16	0.16		
7	1.00	0.198	0.350	0.300	0.16	0.16	0.059	0.030
-	, .		2.50		0.16	0.16		
5	1.00	0.198	0.350	0.300	0.16	0.16	0.059	0.030
,	1 . 4	0.198	0.350		0.14	0.16		
	1.00	0.718	0.330	0.300	0.16	0.16	0,059	0.030
1		0.198	4.254		0.16	0.16	-	
	1.00	0.118	0.350	0.300	0.16	0.16	0.059	0.030
8	1.00	m 1011	4 300	24.	0.16	0.16		
<u> </u>	1.06	0.198	0.350	0.300	0.16	0.16	0.059	0.030
							-	
							-	

Instrument: Cal Date:

1-0000 -7161 5-24-17

Instrument: 1-0000 - 1280

Inspector:

T. c,2000

Due Date:

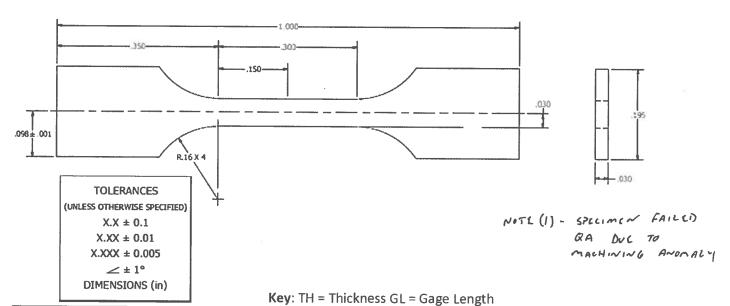
5-24-18

Cal Date: Due Date:

5-24-17 5-24-18

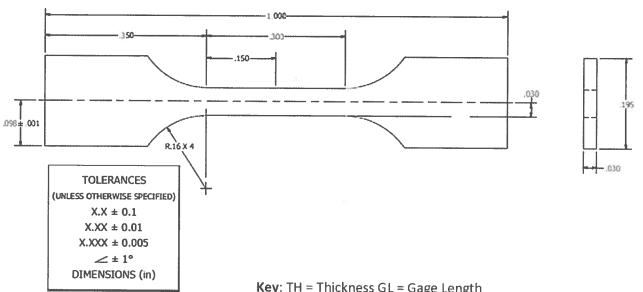
Date:

DIGITAL MIC O-6" MITUTOYO OPTICAL COMPARATER SCHERR - TUMICO



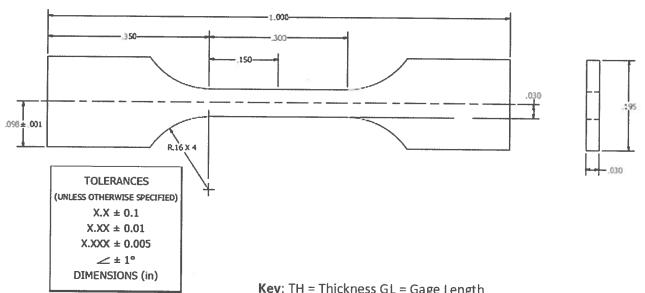
AS MACHINED DIMENSIONS SPECIMEN I.D. "1.00" "0.195" "0.350" "0.300" "R0.16" GL "0.060" TH "0.030" 0.16 0.16 2001 1.00 0.197 0.350 0.300 0.16 0.16 0.060 0.030 0.16 0.16 -0.350 1.00 0.197 0,300 0.060 0.16 0.16 0.030 0.16 0.16 1.00 0.197 0.300 0.061 0.350 0.16 0.16 0.030 0.16 0.16 0.197 1.00 0.350 0.300 0.060 0.030 0.16 0.16 0.16 0.16 0.197 0.350 0.300 1.00 0.16 0.16 0.060 0.030 0.16 0.16 0.300 1.00 0.197 0.350 0.16 0.14 0.030 0.060 0.16 0.16 1.00 0.150 0.197 0.300 0.16 0.16 0.060 0.030 NOTE (1) NOTE (1) NOTE (1) MOTE (1) NOTE (1) NOTC(1)

Instrument: Inspector: 77 Instrument: 1-0000-1780 1-0000-7161 Cal Date: Cal Date: 5-24-17 5-24-17 Due Date: Due Date: 5-24-18 5-24-18 Date: 8-17-17 DIGITAL MIC OFTICAL COMPARATOR O-G' mITUTOYO ScHARR - Tumico



		Ve	y: TH = THICK	Hess GL = Ga	ige Length			
			AS MACHI	NED DIMENS	SIONS			
SPECIMEN I.D.	"1.00"	"0.195"	"0.350"	"0.300"	"RO	0.16"	GL "0.060"	TH "0.030"
3 1	,				0.14	0.16		
2815	1.00	0.155	0.350	0.300	0.14	0.16	0.058	0.030
	10.	.0 -		_	0.16	0.16		
۲	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0.030
3					0.16	0.16	_	
7	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0.030
L ₁		0 -			0.14	0.16		
9	1.00	0.195	0.350	0.300	0.16	6.16	0.058	0.030
5		A			0.16	0.16		
7	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0.030
,			- ~		0.16	0.16		
6	1.00	0.195	0.350	8.300	0.16	0.16	0.058	0.030
	1	_			0.16	0.16	_	
7	1.00	0.195	0.350	0.300	0.16	0.14	0.058	0.030
8		_			0.14	0.16	_	
D	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0.030
]	

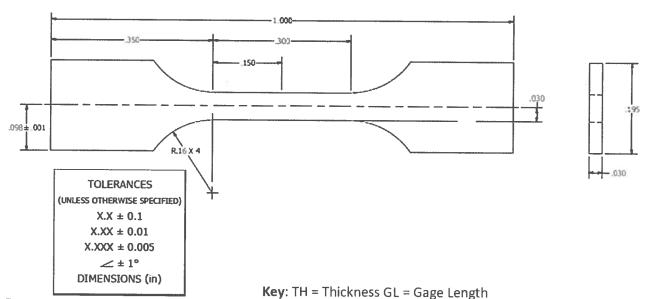
Instrument: 1-0000-1280 Inspector: Instrument: 1-0000 - 7161 Cal Date: 5-24-17 Cal Date: 5-24-17 8-16-17 Due Date: 5-24-18 Due Date: 5-24-18 Date: DIGITAL MIC 0-6" MITUTOYO OFTICAL COMPORATOR SCHERA - TUMICO



		N.E	y. In - Inick	HESS OF = Ca	ge Length			
			AS MACHI	NED DIMENS	IONS			
SPECIMEN I.D.	"1.00"	"0.195"	"0.350"	"0.300"	"RO	0.16"	GL "0.060"	TH "0.030"
					0.16	0.16		
2F01-1	1.00	0.195	0.350	0.300	0.16	0.16	0.060	0.030
					0.16	0,14		
ζ	1.00	0.195	0.356	6.300	0.16	0.16	0.060	0.030
,					6.16	0.16		
3	1.00	0.195	0.350	0.300	0.16	0.16	0.040	0.030
	,				0.16	0.16	_	
4	1.00	0.195	0.350	0.300	0.14	0.16	0.040	0.020
,					0.16	0.16	.	
5	1.00	0.195	0.350	0.360	0.16	0.16	0.060	0.030
,					0.16	0.16	<u>.</u> i	
(1.00	0.195	0.350	0,366	0.16	0.16	0.060	0.030
7	1	9.	. 35.	. 2.	0.16	0.16	_	
	1.00	0.195	0.350	0.300	0.16	0.16	0.060	0.030
8		0~	200		0.16	0.16	-	
D	1.00	0.195	0.350	0.360	0.16	0.16	0.060	0.030
							-	
							4 1	
		<u> </u>						
							4	

T. CROOM Instrument: 1-0000 - 1280 Instrument: 1-0000 - 7/61 Inspector: Cal Date: Cal Date: 5-24-17 5-24-17 Due Date: 8-14-17 Due Date: Date: 5-24-18 DIGITAL MIC OPTICAL COMPARATOR MITUTOYO SCHERR - Tumico

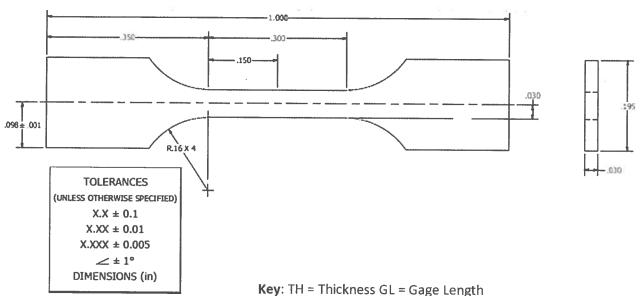
Zion SS3 Specimen



			T	NED DIMENS				
SPECIMEN I.D.	"1.00"	"0.195"	"0.350"	"0.300"	"RO	0.16"	GL "0.060"	TH "0.030"
					0.16	0.16		
2615 1	1.00	0.195	6.350	0.300	0.16	0.16	0.059	0.030
					0.16	0,16		
7	1.00	0.195	0.350	0.300	0.16	0.16	0.059	0.030
					0.16	0.16		
3	1.00	0.195	0.350	0.360	0.14	0.16	0.059	0,030
J					0.16	0.16		
4	1.00	0.195	0.350	0.300	0.16	0.16	0.059	0.036
					0.16	0.16		
5	1.00	0.195	0.350	0.300	0.16	0.16	0.059	0.036
,			_		0.16	0.16	_	
6	1.00	0.195	0.350	0.300	0.16	0.16	0.059	0.030
	,				0.16	0.16	_	
7	1.00	0.195	0.350	0.300	0.16	0.16	0.054	0.030
8			_	_	0.16	0.16	_	
δ_	1.00	0.195	0.350	0.300	0.16	0.16	0.059	0.030
							_	
							-	
							-	

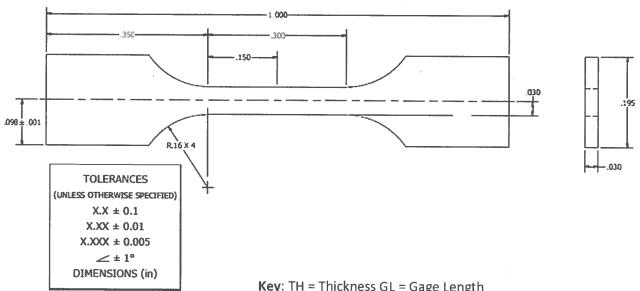
T. 6.2000 Instrument: Instrument: 1-0000-1280 1-0000 - 7141 Inspector: Cal Date: Cal Date: 5-24-17 5-24-17 Due Date: Due Date: 5-24-18 5-24-18 Date: 8-14-17 OPTICAL COMPARATOR DIGITAL MIC 0-6" MITUTOYO SCHERR - TUMICO

Zion SS3 Specimen



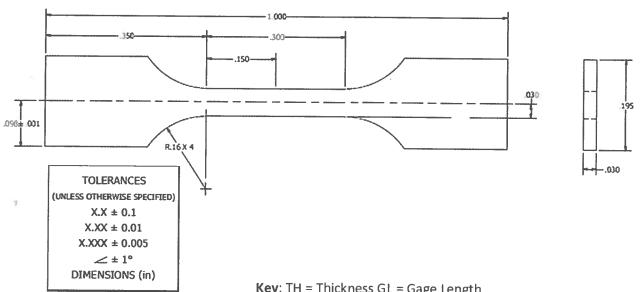
			y. III - IIIICK	11033 01 00	Be religin			
			AS MACHII	NED DIMENS	IONS			
SPECIMEN I.D.	"1.00"	"0.195"	"0.350"	"0.300"	"RO	.16"	GL "0.060"	TH "0.030"
					0.16	0.16		
2H01 1	1.00	0.197	0.350	0.300	0.16	0.16	0.060	0.030
	10.	4			0.16	0.16		
7	1.00	0.197	0.350	0.300	0.16	0.16	0.060	0.030
					0.16	0.16		
3	1.00	0.197	0.350	0,300	0.16	0.16	0.060	0.030
, ,	1				0.16	0.16		
Ч	1.00	0.197	0.350	0.300	0.16	0.16	d.#60	0.030
5			A 2 do		0.16	0.16	_	
7	1.00	0.197	0.350	0.300	0.16	0.16	0.060	0.030
,	1 4.		0 3	_	0.16	0.16	_	
6	1.00	0.197	0.350	0.300	0.16	0.16	0.060	0.030
7	1 00	07	4. 5		0.16	0.16	-	
	1.00	0.197	0.350	0.300	0.16	0.16	0.060	0.030
l «	1 00	۳. ۵		. 7	0.16	0,16	_	
0	1.00	0.197	0.350	0.300	0.16	0.16	0.040	0.030
	E						-	
							-	
								
							-	

Instrument:	1-0000-7161	Instrument: _	1-0000-1280	Inspector:	7.3 C Tickoon
Cal Date:	5-24-17	_ Cal Date:	5-24-17		
Due Date:	5-24-18	Due Date:	5-24-18	Date:	8-17-17
	DIGITAL MIL		OPTICAL COMPARA	ren	
	O-G" MITUTONO		SCHCRR- TURIC		



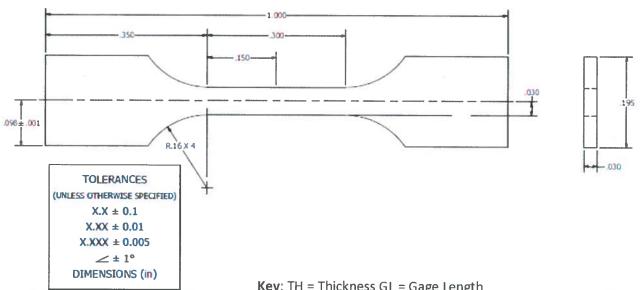
		K		kness GL = Ga	<u> </u>			
			AS MACH	INED DIMENS	SIONS			
SPECIMEN I.D.	"1.00"	"0.195"	"0.350"	"0.300"	"R(0.16"	GL "0.060"	TH "0.030'
					0.16	0.16		
ZI 15	1.00	0.196	0.350	0.300	0.16	0.16	0.059	0.030
	1.				0.16	0. 16		
	2 1.00	0.196	0.350	0.300	0.16	0.16	0.059	0.030
					0.16	2.16		
	1.00	0.196	0.350	0.300	0.16	0.16	0.059	0.030
					0.16	0.16		
	1 1.00	0.196	0.350	0.300	0.16	0.16	0.059	0,030
					8.16	0.16]	
	1.00	0.196	0.350	0.300	0.16	0.16	0.059	0.030
,					0.16	0.16]	
(1.00	0.196	0.350	0.300	0.14	0.16	0.059	0.030
_					0.16	0.16		
7	1.00	0.196	0,350	0.300	0.14	0-14	0.059	0.030
(/	. .			_	0.16	0.16		
8	1.00	0.196	0.350	0.300	0.16	0.16	0.059	0.030
						Ě		
						- 100		

Instrument:	1-0000-7161	Instrument:	1-0000 - 1780	_Inspector:	7.36 T. Choon
Cal Date:	5.24.17	Cal Date:	5-24-17		
Due Date:	5-24-18	Due Date:	5-24-18	Date:	8-14-17
	DIGITAL MIC		OPTICAL COMPARATOR	_	
	0-6 MITUTON/0		SCHERR - Tumico		



				y: TH = Thick	ness GL – Ga	ge tength			
				AS MACHI	NED DIMENS	IONS			
SPECIMEN	VI.D.	"1.00"	"0.195"	"0.350"	"0.300"	"RC).16"	GL "0.060"	TH "0.030"
						0.14	0.16		
2J01	1	1.00	0.194	0.350	0.300	0.16	0.16	6.058	0.030
						0.16	0.16		
- 6	2	1.00	0.194	0.350	6.300	0.14	0.16	0.058	0.030
	•				-	0.16	0.16		
	3	1,00	0.194	0.350	0.300	0.14	0.16	0,058	0.030
						0.16	0.14		
	4	1.00	0.194	0.350	0.300	0.16	0.16	0.058	0.030
1	5			_		0.16	0.16]	
	7	1.00	0.194	0.350	0.300	0.16	0.14	0.058	0.030
	,					0.16	0.16	_	
L	<u>(</u>	1.00	0.194	0.350	0.300	0.16	0.16	0.058	0.030
	_	1		n 7 P \		0.16	0.16	_	
	7	1.00	0.194	0.350	0.300	0.16	0.16	0.058	6.030
	8	1 00	1011			0.16	0.16	_	
	8	1.00	0.184	0,350	0.300	0.16	0.16	0.058	0.030
1								<u> </u>	
<u> </u>								- 11	
								1	

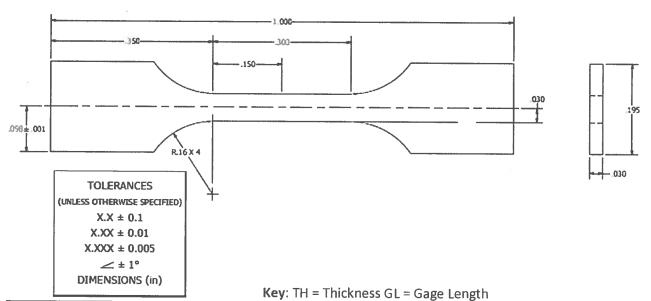
Instrument: Instrument: 1-0000 - 1280 Inspector: 1-0000 - 7161 Cal Date: 5-24-45 17 Cal Date: 5-24-17 Due Date: Due Date: 5-24-18 Date: 8-16-17 DIGITAL MIC OFTICAL COMPARATER 0-6" mITUTO-10 SCHERR - Tumico



		Ke	ey: TH = Thick	cness GL = Ga	age Length	1111		
			AS MACHI	NED DIMENS	SIONS			
SPECIMEN I.D.	"1.00"	"0.195"	"0.350"	"0.300"	"RC	0.16"	GL "0.060"	TH "0.030"
					0.16	0.16		
2K 15 1	1.00	0.195	0.350	0.300	0.16	0.16	0.060	0.030
					0.16	0.16		
2	1.00	0.195	0.350	0.300	0.16	0.16	0.060	0,030
1 2002-240	200				0.16	0.14		
3	1.00	0.195	0.356	0.300	0.14	0.16	0.060	0.030
					0.16	0.16		
4	1.00	0.195	0.35t	0.300	0.16	0.16	0.060	0.030
_					0.16	0.16		
5	1.00	0.195	0.350	0.300	0.16	0.16	0.040	0,030
,					0.16	0.16		
<u> </u>	1.00	0.195	0.350	0.300	0.16	0.16	0.060	0.030
					0.16	0.16	_	M. Me
7	1.00	0.195	0.350	0.300	0.16	0.14	0.060	0.038
()					0.14	0.14		
8	1.00	0.195	6.350	0,300	0.16	0.14	0.060	0.030
				i i				
								-12-11

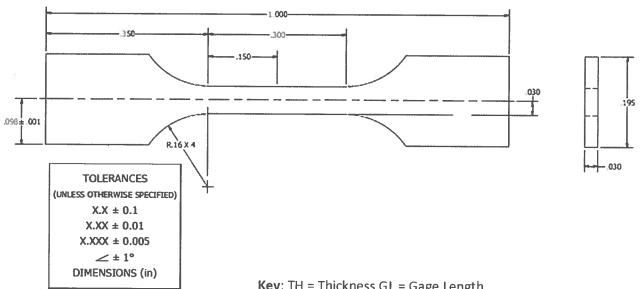
Instrument: Instrument: 1-0000 - 1280 Inspector: 1-0000-7161 Cal Date: Cal Date: 5-24-17 5-24-17 8-14-17 Due Date: 5-24-18 Due Date: Date: DIGITAL MIC 0-6" MITUTOYO SCHCRIZ - Tunica

Zion SS3 Specimen



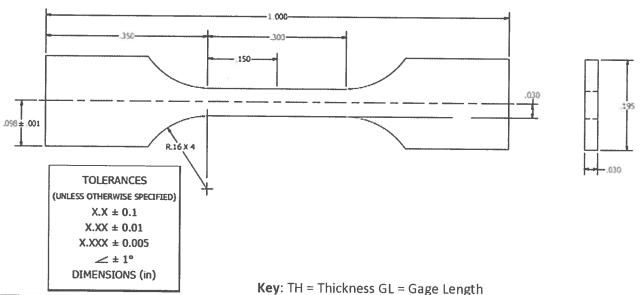
			AS MACHII	NED DIMENS	IONS			
SPECIMEN I.D.	"1.00"	"0.195"	"0.350"	"0.300"	"RC).16"	GL "0.060"	TH "0.030"
2401 1	1.00	0.198	0.350	0.300	0.16	0.16	0.060	0.030
	1.00	0.148	0.350	0.300	0.16	0.16	0.060	0.030
3	1.00	0.198	0.350	0.300	0.16	0.16	0.060	0.030
L	1.00	0.198	0.350	0.300	0.16	0.16	0.060	0.030
5	1.00	0.198	0.350	0.300	0.16	0.16	0.060	0.030
<u></u>	1.00	0.198	0.350	0.300	0.16	0.16	0.068	0.030
7	1.00	0.198	0.350	0.300	0.16	0.16	0.060	0.030
8	1.00	0.198	0.350	0.300	0.16	0.16	0.866	0.030
							-	

Instrument: Inspector: Instrument: 1-0000-7161 1-0000-1280 Cal Date: Cal Date: 5-24-17 Due Date: 5-24-18 Due Date: 5-24-18 Date: DIGITAL MIC OFTICAL COMPARATOR 0-6" MITUTOYO SCHERR - TURGO



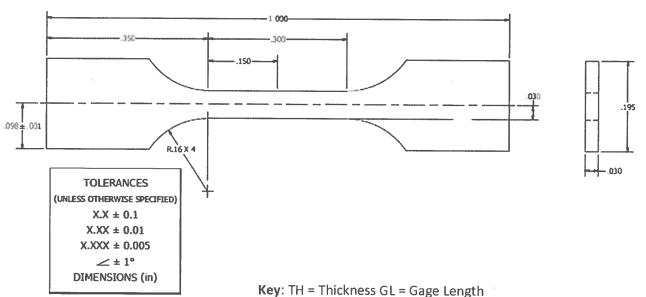
		Ke	ey: TH = Thick	iness GL = Ga	ige Length			
			AS MACHI	NED DIMENS	IONS			
SPECIMEN I.D.	"1.00"	"0.195"	"0.350"	"0.300"	"R0.16"		GL "0.060"	TH "0.030"
					0.16	0.16		
2m15	1 1.00	0.195	0.350	0.300	0.16	0.14	0.060	0.030
					0.16	0.16		
	1.00	0.195	0.350	0.300	0.16	0.16	0.060	0.030
					0.16	0.16		
	1.00	0.195	0.350	0.300	0.16	0.16	0.060	0.030
,	,				0.16	0.16		
L	1.00	0,195	0.350	0.300	0.16	0.14	0.060	0.030
	_				0.16	0.16	_	
5	1.00	0.195	0.350	0.300	0.16	0.16	0.060	0.036
,					0.16	0.16	_	
6	1.00	0.195	0.350	0.300	0.16	0.16	0.060	0.030
7					0.16	0.16		
	1.00	0.195	0.350	0.300	0.16	0.16	0,060	0.036
8		_			0.16	0.16	_	
D	1.00	0.195	0.350	0.300	0.14	0.16	0.060	0.030
							_	
							_	
							_	

Instrument: Instrument: 1-0000 - 1280 Inspector: 1-0000 - 7161 Cal Date: Cal Date: 5-24-17 5-24-17 Due Date: Due Date: 5-24-18 Date: 5-24-18 8-14-17 OPTICAL COMPARATOR DIGITAL MIC 0-6" MITUTOYO SCHERR - TUMICO



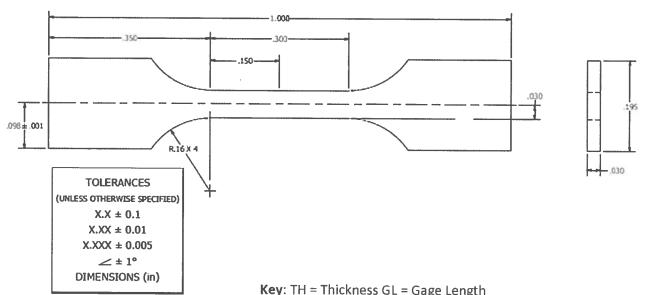
		110	y. III - IIIICK	iless OL - Oa	ge Length			
			AS MACHI	NED DIMENS	IONS			
SPECIMEN I.D.	"1.00"	"0.195"	"0.350"	"0.300"	"R0.16"		GL "0.060"	TH "0.030"
					0.16	0.16		
ZN01 1	1.00	0.195	0.350	0.300	0.16	0.16	0.08	0.030
					0.16	0.16		
2	1.00	0.195	0.356	0.300	0.16	0.16	0.058	0.030
5					0.16	0.16		
3	1.00	0.195	0.350	0.30v	0.16	0.16	0.058	0.030
1,					0.16	0.16		
4	1.00	0,195	0.350	0.300	0.16	0.16	0.058	0.030
~				0.300	0.16	0.14		
5	1.00	0.195	0.350	0.300 0.3.00	0.14	0.16	0.058	0.030
,					0.16	0.66		
	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0.030
7					0.16	0.16		
	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0.030
0.1					0.16	0.16	_ `	
- 8	1.00	0.145	0.350	0.300	0.16	0.16	0.058	0-830
							_	
							_	
							_	

Instrument:	1-0000-7161	Instrument:	1-0000 - 1280	Inspector:	2)C T. Crom
Cal Date:	5-24-17	Cal Date:	5-24-17	_	
Due Date:	5-24-18	Due Date:	5-24-18	– Date:	8-16-17
	DIGITAL MIC		OPTICAL COMPARATOR	-	
	0-6" M. TUTO 10		SCHERR - Tumico	•	

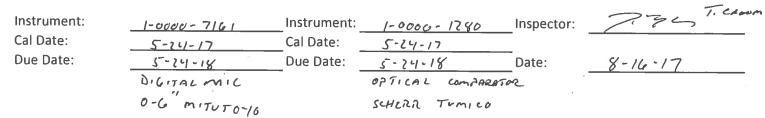


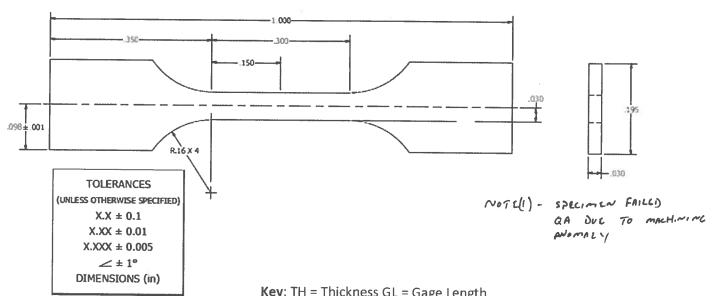
			y. III - IIIICK						
AS MACHINED DIMENSIONS									
SPECIMEN I.D.	"1.00"	"0.195"	"0.350"	"0.300"	"R0.16"		GL "0.060"	TH "0.030"	
2015 1	1.00	0.196	0.350	0.300	0.16	0.16	0.060	0.030	
2	1.00	0.196	0.350	0.300	0.14	0.16	0.060	0.030	
3	1.00	0.146	0.350	0.300	0.16	0.16	0.060	0.030	
4	1.00	0.194	0.350	0.300	0.16	0.16	0.660	0.030	
5	1.00	0.196	0.350	0.300	0.16	0.16	0.060	0.030	
6	1.00	0.196	0.356	0.300	0.16	0.16	0.060	0.030	
7	1.00	0.196	0.350	6.300	0.16	0.16	0.060	0.030	
8	1.00	0.196	0.350	0.300	0.16 0.16	0.16	0.060	0.030	

TICKOOM Instrument: Inspector: 1-0000 - 7161 Cal Date: Cal Date: 5-24-17 5-24-17 Due Date: Due Date: 5-24-18 5-24-18 Date: DIGITAL MEC OPTICAL COMPARATOR O-6" mITUTOYO SCHERR - TUMICO



		- 110	y. III - IIIICK	11C33 GL - Ga	ge Length			
			AS MACHII	NED DIMENS	IONS			
SPECIMEN I.D.	"1.00"	"0.195"	"0.350"	"0.300"	"R0.16"		GL "0.060"	TH "0.030"
					0.16	0.16		
2P01 1	1.00	0.195	0.350	0.300	0.14	0.16	0.060	0.030
					0.16	0.16		
7	- 1.00	0.195	0.350	0.300	0.16	0.16	0.060	0.030
					0.16	0.16		
3	1.00	0,195	0.350	0.300	0.16	0.16	0.060	0.030
					0.16	0.16		
4	1.00	0.195	0.350	0.300	0.16	0.16	0.060	0.030
	_				8.16	0.14	_	
	1.00	0.195	0.350	0.300	0.16	0.14	0.060	0.030
,	1,	0			0.16	0.16	_	
4	1.00	0.195	0.350	0.300	0.16	0.16	0.060	0,030
1 _		0.4~			0.16	0.16		
7	1.00	0.195	0.350	0.300	0.16	0.16	0.060	0.030
		0.5		_	0.16	0.16		
8	1.00	0.195	0.350	0.300	0.16	0.16	0.060	0.030
							_	
							_	
1]	

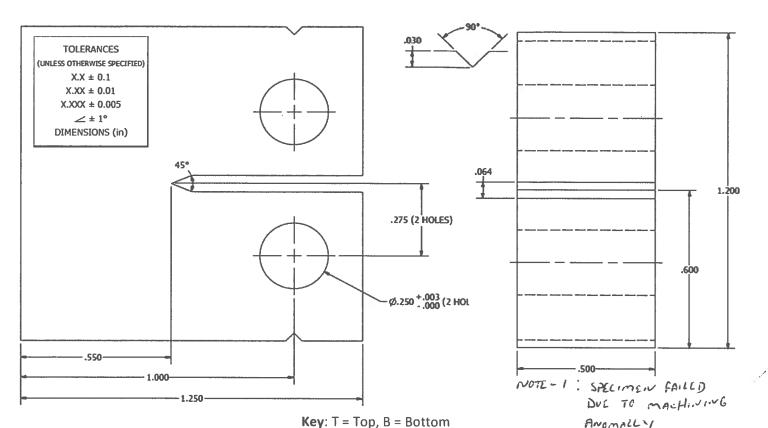




		Ke	y: TH = Thick	ness GL = Ga	ige Length						
AS MACHINED DIMENSIONS											
SPECIMEN I.D.	"1.00"	"0.195"	"0.350"	"0.300"	"RC).16"	GL "0.060"	TH "0.030"			
2.					0.16	0.16					
2015 1	1.00	6.197	0.350	0300	0.16	0.16	0.060	0.030			
					0.16	0.16					
	1.00	0.197	0.350	0.300	0.16	0.16	0.060	0.030			
	,				0.16	0.16					
3	1.00	0.197	0.350	0.300	0.14	0.16	0.060	0.030			
					0.16	0.16					
4	1.00	0.197	0.350	0.300	0.16	0.16	0.060	0.030			
5			. 3	7.4.	0.16	0.16					
<u> </u>	1.00	0.197	0.350	0.300	0.16	6.14	0.060	0.030			
Ç	1.00	0.197	0.350	0.300	0.16	0.16		3.			
τ_		0.717	0,300	0.700	0.16	0.16	0.060	0.030			
7	1.00	0.197	0,350	0.300	0.16	0.16	5.1/-	0.030			
					0.16	NoTSU)	0.160	0.830			
8	MOTE (1)	NOTE (1)	NOTE (1)	~OTE (1)	WOLL (1)	Nº019	NOTE(1)	MOTE (1)			
			_								
							1				

Instrument:	10000-7161	Instrument	1-0000-1780	_Inspector:	27 CT. LADOR
Cal Date:	5-24-17	Cal Date:	5-74-17		
Due Date:	5-24-18	Due Date:	5-24-18	– Date:	8-17-17
	DIGITAL MIC		OFTICAL COMPARATOR	- .	
	O-G" MITUTEYO		SCHERR - Tumico	•	

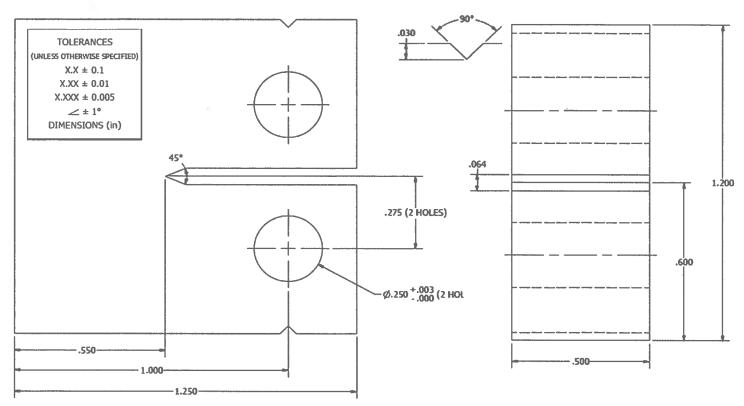
Block F3



	ксу. 7 – 10р, в – воссон										<u>-1</u>	
				AS	MACHIN	ED DIM	NSIONS					
SPECIMEN I.D.	"1.250"	"1.200"	"1.000"	"0.550"	"45.0°"	"0.030"	"90.0°"	"0.275"	"0.250"	"0.500"	"0.600"	"0.064"
3N_	,				اه	0.030		T 0.274				
300	1.251	1.202	1.000	0.555	45.0	0.030	90.0	B 0.274	B 0.250	0,499	0.600	0.064
3~			,		,,	D:030	9000	T 0.2 75	T 0.250			
3/4-2	1.252	1.200	1.000	0.555	45.0	0.030	90.0	B 0,275	B 0.250	0.499	0.600	0.064
			۱,		v	0.030	90.00	TO 275	T 0.250			
3A-1	1,251	1.505	1.000	0.554	45.0	0.030		B 0.775	B 0.250	0.500	0.600	0.064
1 20 2					NOTE-1	(مار	13 ¹ / ₁ 1 ² / ₂ 1	T his	B WETEL	NEFE	NETC-1	10/11
3A - C	NoTE-1	NOTE-1	NoTEI	NOTE-1	NOTE-1	27.	47	B	Biv	Wo.	N	100
22 .					€	6.030	90.00	T (1.275	T v. 256			
38-1	1.250	1.202	1.000	0.554	45.0	0.030		B 0.275		0.500	0.600	0.064
20.2					υ	0.030	90,00	T 0.275	T 0.250			
3B-5	1.250	1.201	1.000	0.554	45.0	0.030	90,00	B 0.275		0,500	0.600	0.064
22 1	(>				0	0:030	40,0°	T 0.275	T 0.250			,
30-1	1.251	1.202	1.000	0,554	45.0	0.036		B 0.275	B 5.250	0.500	0.600	0.064
3 3 3	: 7 (5)				. 0	0.030	30.00	T 0.275	To:250		_	
3D-5	1.250	1201	1.000	0,554	450	0.030	40.00	B 0.275	B 0.250	0.500	0 600	0-064

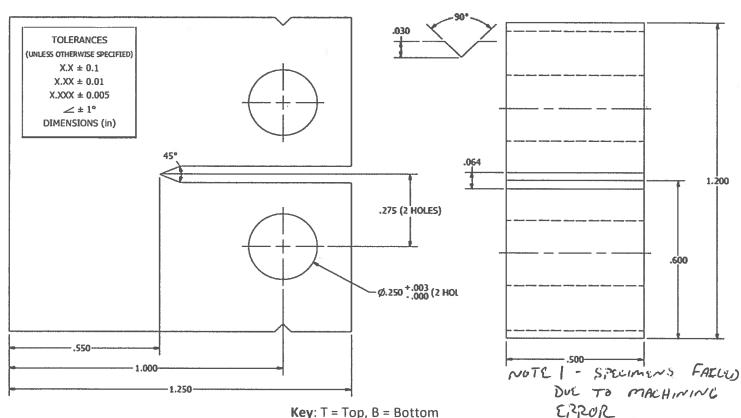
)

Instrument:	1-1280-0000	Instrume <u>nt:</u>	1-0000-7161	_Inspector <u>:</u> _	7.3c T. c.com
Cal Date:	5-24-17	Cal Date:	5-24-17	_	
Due Date:	5-24-18	Due Date:	5-24-18	_Date:	9-27-17
	OFTICAL COMPARATOR	D10	G" MITUTOYO	Ĉ	·



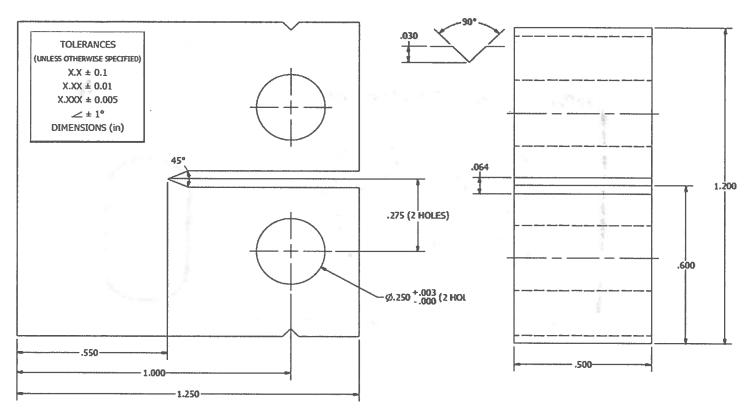
AS MACHINED DIMENSIONS												
SPECIMEN I.D.	"1.250"	"1.200"	"1.000"	"0.550"	"45.0°"	"0.030"	"90.0°"	"0.275"	"0.250"	"0.500"	"0.600"	"0.064"
						0,030	90.0	TO.275	T6.750			
38-1	1.750	1.201	1.000	0.554	45:0	0.030	90.0	B 0.275	B0.750	0.500	0.600	0.064
						0.030	900	T 0.275	T0.250			
38-5	1,250	1.201	1.000	0.554	45.0	0.030	90,00	B 0.275	B 0.750	6.497	0.600	0.064
201		1 3			,	0.030		T 0.775		• • •		
3F-1	1.250	1.201	1.000	0.554	45.0	0.030		B 0,275	B 0,250	0.497	0.600	0.064
200					3	0.030		TO-275				16.
3F-2	1.251	1.201	1.000	0.552	45.0	0.024	90.0"	B 0.275	B 3.250	0.500	0.66	2.064
2/ /					1. 6	0.030	90.0	T 0-275	T 0,253			
36-1	1.750	1.701	1,000	0.552	45.0	0.079		B 0. 275		6.500	0-600	0.064
1 3/ 2	/					0,030	400	T 0-275	T0.754			
36-6	1.751	1,200	1.000	0.554	45.0	0.029	90.00	B 0: 275	B0:254	0.499	0.600	0.064
211			1 45		, 0	0.029	90.00	T 0. 275	To, 254			
34-1	1.251	1.200	1,000	0.552		0.029	40.00	B 0.275	B 0.254	0-500	0.600	0.064
241.2					1.00	0.029	90.00	To.275	T0.252		4.	
3H-2	1.745	1,701	1.000	0.552	45.0	0.029	90.00	B 0 275	B 0.252	0.449	0.600	0.064

Instrument:	1-1280-6000	Instrument: 1-0000-7161	_Inspector <u>:</u> _	235 Tiesbour
Cal Date:	5-24-17	Cal Date: 5-24-17	_	
	SCHERR-TUM. LO	Due Date: 5-24-18 DIGITAL OUTSIDE/INSIDE MIC O-6 MITUTOYO	_Date:	10-13-17



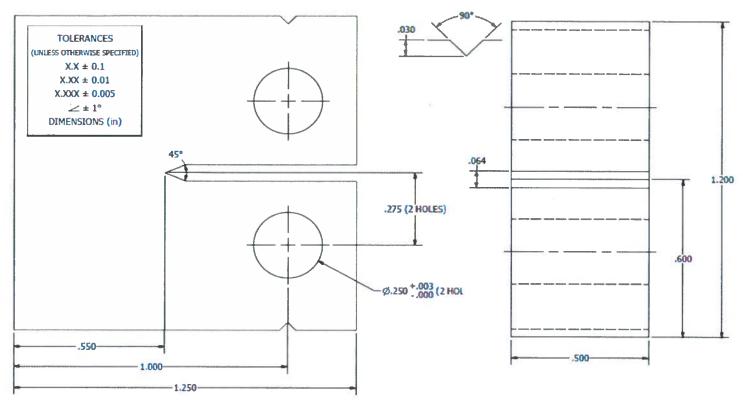
				- 1	Cy. 1 - 1	υp, υ = ι	ottom			11010		
				AS	MACHIN	ED DIME	NSIONS					
SPECIMEN I.D.	"1.250"	"1.200"	"1.000"	"0.550"	"45.0°"	"0.030"	"90.0°"	"0.275"	"0.250"	"0.500"	"0.600"	"0.064"
24. 2					ē.	0,028		T 0.275	T 0.750			
3N-3	1,257	1.202	1.000	0.553	45.0	0.028		B 0.275	B 0.250	0,501	0.600	0,064
3N-4					. 0	850.0	90.00	T0.275				
210 - 1	1.252	1.201	1.000	0.553	45.0	8.028	90.00	B 0.275	B 0.250	0.502	0.600	0.064
ו עכ								Т	Т	20		
3K-1								В	В			
7 7								Т	Т			
316-C								В	В			
21.1								T	Т			
3L-1						4		В	В			
21 2					NO			Т	T			
3L-5					10			В	В			
2 2								Т	Т			
30-3								В	В			
2, 4								Т	Т			
20-1								В	В			

Instrument	: 1-1380-0000	_Instrume <u>nt:</u>	1-0000 - 7161	_Inspector <u>:</u>	7.76 Ticho
Cal Date:	5-24-17	_Cal Date:	5-24-17	_	
Due Date:	5-24-18	Due Date:		_Date:	11-6-17
	OPTICAL COMPARATOR SCHELR-TUM.CO		G" MITUTOYA	716	



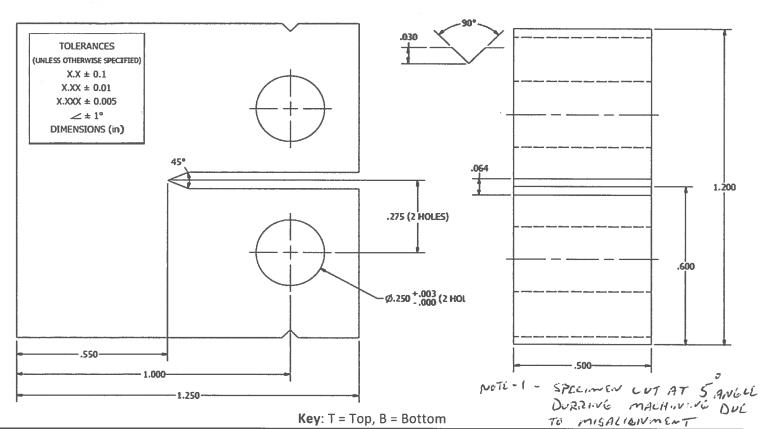
	AS MACHINED DIMENSIONS												
	SPECIMEN I.D.	"1.250"	"1.200"	"1.000"	"0.550"	"45.0°"	"0.030"	"90.0°"	"0.275"	"0.250"	"0.500"	"0.600"	"0.064"
	3A-3	1.250	1.200	1.000	0:554	45,00	0.039	Qu.00	T 0.275 B 0.275	T 0.75%	0.494	6.600	0.064
ı	241 7	1,530		1,000	0:33 (10,0	0.029	30,00		T 0.250	0.991	0,600	0,00
ı	3A-4	1.250	1.200	1.000	0.554	45.0	0.029	- N		B a 250	0.498	0.600	0.064
	32-3	1500	1 707	1.000	2000	lie !	0.029			T 0.250		A 187 A	
	26-2	1.257	1.703	1.000	0.554	45.0	0.029	- 4	B a.275		0.500	0.600	0.064
	38-4	1.251	1.201	1.000	0.554	45.0	856.0		T 0.7 75		0.502	0.400	0.064
1	32-3	1.255 12				U = 0	0.028	9000	T 0.275	T 0.250			
ı	717 7	1247	1.203	1.000	0.555	45.0	0.028		B 0.275		0,501	0.600	0.064
ı	33-4	1.247	1.202	1.000	0.555	45.0	850.0		T 0.275 B 0.275		0.501	0.600	0.064
~	30-3			`			850.0	90.00	T 0.275	T 0.250			
	317-7	1.253	1.202	1.000	0.554	45.0	0.028		B 0.275		0.500	0.600	0.064
	30-4	1.253	1.703	1.000	0.554	45.00	85028 0.028	da.	T 0.275	T 0.250 B 0.260	0.500	0.600	0.069

Instrument	1-1780-0000	Instrume <u>nt:</u>	1-6000-7161	_Inspector <u>:</u>	7. The T. Chosm
Cal Date:	5-24-17	Cal Date:	5-24-17	_	
Due Date:	5-24-18	Due Date:	5-24-18	_Date:	11-6-17
	OPTICAL COMPARATUR SCHEUZ - TUMICO		TAR OUTSIDE / WEIDER	n (C	



	Rey. 1 - 10p, b - bottom											
	AS MACHINED DIMENSIONS											
SPECIMEN I.D.	"1.250"	"1.200"	"1.000"	"0.550"	"45.0°"	"0.030"	"90.0°"	"0.275"	"0.250"	"0.500"	"0.600"	"0.064"
					6)	0.028	90.0	T 0.275	T 0.250			
3F-3	1.253	1.201	1,000	0.553		0.028		B 0.275		0502	0.600	0.064
Dr 11					. ,	0.028	90.00	T 0.275	T 0.250			
3F-4	1.252	1.201	1.000	0.553	45.0	0.028	90.00	B 0.275	B 0.250	0.501	0.600	0.064
21 2					1. 0	6.028	90.00	T0,275	T 0.250			
36-3	1.225	1.202	1.000	0.55	45.0	0.028	40.00	B 0.275	B 0.250	0.502	0.600	0.064
2 - 11		,			1. 0	0.028	90.00	T 0.275	T 0.250			
36-4	1.252	1.201	1.000	0.553	45,0	0.028	90.00	B 0, 275	B 0.250	0.503	0.600	0.064
211 2					. ,	0.028		T 0.275				•
314-3	1.251	1.202	1.000	0.553	45.00	0.028	90.00	B0.275	B 0.250	0,502	0.600	0.064
21. 16						0.028	90.00	T0.275	T 0.250	· .		•
3H-4	1.253	1.703	1.000	0.553	45.0	850.0		B 0.275		0.503	0,600	0,069
J J		,			4. 1	850.0	90.00	T0.275	T 0.256			
77.2	1.257	1.205	1.000	0.553	45.0	0.028		B 0.275		0,502	0.600	0.064
27 4		£ 15	,		1105 8	0.028	90.00	T 0.275	T0.250			
27 - 1	1.225	1.201	1.000	0.533	45.0	0.028	90.00	B 0.275	B 0.250	0.502	0.600	0.464

Instrument:	1-1280-0000	Instrume <u>nt:</u>	1-0000 - 7161	Inspector <u>:</u>	276	Tickory
Cal Date:	5-24-17	Cal Date:	5-24-17	-		
6	5-24-18 PATICAL COMPARATO SCHEER - TUMICO	in i	5-24-18 DIGITAL OUTSIDE/INSIDE 0-6" MITUTOYA	Date:	11-6-17	



	AS MACHINED DIMENSIONS											
SPECIMEN I.D.	"1.250"	"1.200"	"1.000"	"0.550"	"45.0°"	"0.030"	"90.0°"	"0.275"	"0.250"	"0.500"	"0.600"	"0.064"
31-1	1000	17.		6 601	1 - 0	0.08	90.00	1	T0.750	missa		
21	1.750	1.202	1.000		45.00	0.079			B 0.250	0.459	0,600	0,064
3I-Z	1.750	1.701	1.000	0.554	45.0	0.039	90.0°	T 0.275	T 6.254	0.499	0.600	0.064
3-1	. 7				. ,	0.079	90.00	T 0.275	T 0.250			
35-1	1.750	1.201	1.000	0,554	45.6	0.029			B 0.250	0.499	6.600	0.064
35-2	1,751	1,201	1.090)	0.554	45.00	0.029	90.00		T 0.250 Bo.250	0,499	0,600	0.064
3M-1	1.750	1.202	Nilit	المالك المالك	45.01	0.024	90.00	T 0.275	T 0,250	0.420		2 0/11
3/1	11620	1.000				0.029	90.00		B 0.250 T 0.250	U. 177	0.600	0.064
3M-2	1.249	1,767	WILL.	NOIS	45.0	0.028			B 0,250	0.457	0.600	0.064
3.1		1.2.2	<i>i</i>	<i>i~/</i> -3	, ,	6.029			T 0.757	_		
30-1	1.251	1.202	1.00	0.553	45.0	0.030	90.00	B 0,275	B 0,252	0.500	0.600	0.064
30-2	1.251	1.702	1,00	0.553	45.00	0.030			BMIL!	0.500	0.600	0.064

- crosm Instrument: 1-1780-0000 Instrument: 1-0000-7161 Inspector: 775

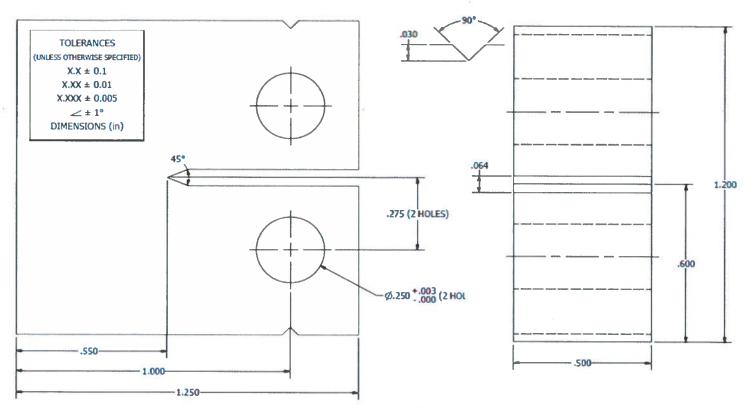
Cal Date: 5-24-17 Cal Date: 5-24-17

Due Date: 5-24-18 Due Date: 5-24-18 Date: 16-18-17

OFTICAL COMPALATO DIGITAL OUTSIDE/WBIDE MIC NOTE-2- SPECIMEN HOLLS

SCHEER-TUMICO O-C' MITUTO'LE SLIGHTLY SCALUPED DUE

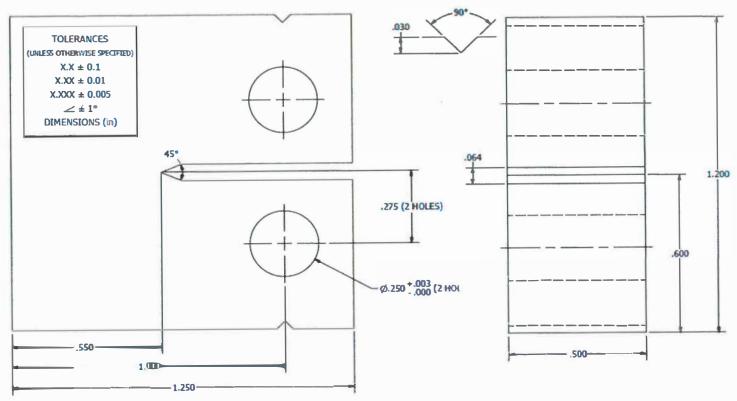
SLIGHTLY SCALLUILD DUE TO PILOTING EXRUR.



itey. 1 Pop, 5 - Bottom												
				AS	MACHIN	IED DIMI	ENSIONS					
SPECIMEN I.D.	"1.250"	"1.200"	"1.000"	"0.550"	"45.0°"	"0.030"	"90.0°"	"0.275"	"0.250"	"0.500"	"0.600"	"0.064"
						0.028	90.0	T0,275	T 0.256			
35-3	1.251	1.202	1.000	0.553	45.0	0.028		B 0.275		0.501	0.600	0.069
\ - U		1				0.024	16-80	TO. 275	T0.250			,
35-4	1.252	1.202	1.000	0.553	45.00	0.028	90.0	B 0.275	B 0.250	0.500	0.600	0.064
\alpha_1, \q						6,028	90.00	T0.275	T 0.256			
3K-3	1.253	1.203	1.000	0.553	45.0	0.028	90.00	B 0.275	B 0.750	0.500	0.600	0.064
31. 11	1					0.028	90.00	T 0.275	T 0.250			
311-4	1.252	1.202	1.000	0.553	45.0	0.028	90.00	B 0.775	B 0.250	0.500	0.600	0.069
71 7				_	, ,,	0.028	90.00	T 0.275	T 0.758			
31-3	1.251	1-201	1.000	0.553	45.00	0.028	90,00	B 0.275	B 0.250	0.503	0.600	0.064
5					,	0.028	90.00	T 0.275	T 0.250			_ ′
31-4	1.253	1.202	1.000	0.553	45.0	0,028			B 0.250	0.502	0.600	0.064
200 3	_				9)	0.028	90.00	T 0:275	T 0.250			
3M-3	1.251	1.200	1.000	0.553	45.00	0.028		B 0.275		6.503	0.600	0.064
200 11					, (2)	850.0	90.00	T 0.275	T 0.250			
3m-4	1.252	1.501	1.000	6.503	45.00	850.0	90.00	B 0.775	B 0.250	0.503	0.600	0.064

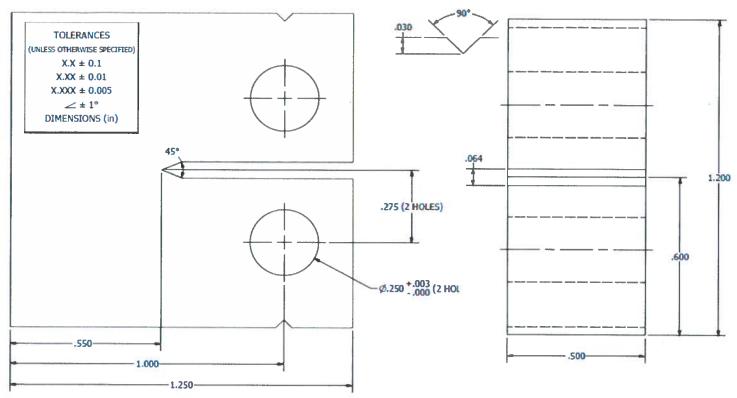
Instrument	:	Instrument: 1-0000 - 7(4)	Inspector:	230,	T. crom
Cal Date:	5-24-17	Cal Date: 5-24-17	_	,	
	5-24-18	Due Date: ゾーとソーナタ	Date: _	11-6-17	, (F
	OPTICAL COMPARATOR SCHEZR- TUMICO	DIGITAL OUTSIDE /INSIDE MIC			

Block F4



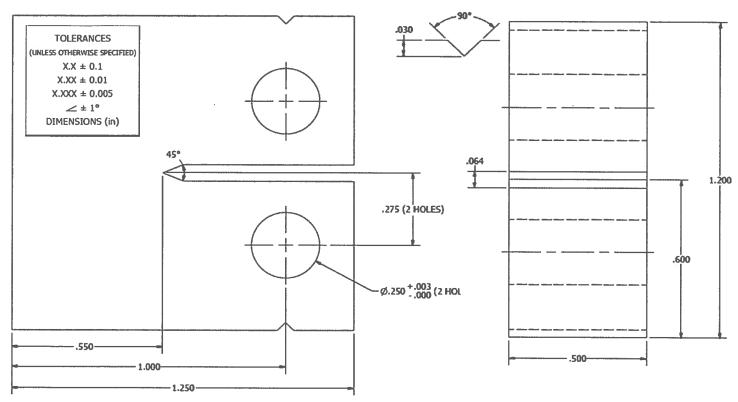
rey. 1 = 10p, B = Bottom												
				AS	MACHIN	ED DIME	NSIONS					
SPECIMEN I.D.	"1.250"	"1.200"	"1.000"	"0.550"	"45.0°"	"0.030"	"90.0°"	"0.275"	"0.250"	"0.500"	"0.600"	"0.064"
					0	0.018	90.00	T 0.275	T 6,250			
1A-1	1.251	1.200	1.001	0.551	45.0	0 0 2 2 8	90.00		B 0. 250	0.500	0.600	0.064
		(4	0.028	90.00	T 0.275	T 0,250			
2	1.251	1.200	1.001	0.551	45.0	0.028	30.0	B 0.275	B 0.250	0.500	0.600	0.064
						0.028		T 0.275	T 0.250			
3	1.251	1.200	1.001	0.551	45.0	0.058	90.00	B 0.275	B 0.250	0.500	0.600	0.064
	1					0.028	90.00	T 0.275	T 0.250			
ال	1.250	1.200	1.000	0.550	45.0	0.028	90.00	B 0.275		0.500	0.600	0.069
, _					. ,	0.058	90.00	T 0.275				
43-1	1.250	1.500	1.000	0.550	45.0	0.028	90.0	B 0. 275		0-500	0.600	0.064
					. 0	0.058						
7	1.251	1,200	1.001	2551	215.00	0.028		B 0.275	B 0.250	0.500	0.600	0.069
7					1445 ()	0.028		T 0.275	T 0.256			
)	1,251	1.200	1.001	0.551	45,00	0.028	90.00		B 0.250	0.500	0.600	0.064
			ų.		0	0.026	90.00		T 0.250			
	1.250	1. 200	1.000	0.550	45.0	0.028	90.0	B 0.275	B 0.250	0.500	0.600	0.064

Instrument:	1-1280-0000	Instrument:	1-0000-7161	Inspector:	2.75 T. CROSM
Cal Date:	5-24-17	Cal Date:	5-24-17	-,5	
Due Date:	5-24-18		5-24-18		18 DEC 17
	OPTICAL COMPARATOR	D16	ITAL OUTSIDE/INSIDE	MIL	
	SCHERR. Tumico	0 -	-6" MITUTON10		



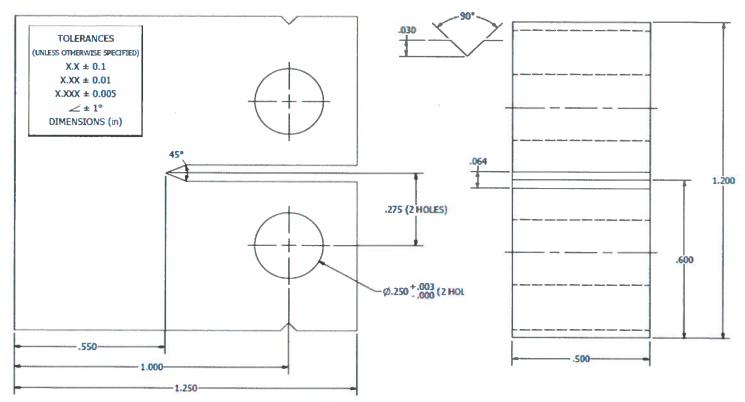
AS MACHINED DIMENSIONS												
	"4 056"	"4 006"					1		T	Г.,	T	l u a a a a a
SPECIMEN I.D.	"1.250"	"1.200"	"1.000"	"0.550"	"45.0°"	"0.030"	"90.0°"	"0.275"	"0.250"	"0.500"	"0.600"	"0.064"
						0.028	90.0	T 0.775	T 0.250			
4(-1	1.251	1,200	1.001	0.551	45.0	0.028	90.0°	B 0.775	B 0.250	0.500	0.600	0.064
					1 .	0.028	90.00	T 0.275	T 0.250			
2	1.250	1.200	1.000	0.550	45.00	0.028	90.00		B 0.250	0.500	0.600	0.064
						0.028	90.00	T 0.275	T 0,250		-	·
3	1.250	1.200	1.000	0.550	45.0	0.028	90.00		B 0.750	0.500	0.600	0.064
					0	0.028	90,00	T 0.275	T 0-250			
4	1.250	1.200	1.000	0.550	45,0	0.028		B 0.275	B 0.250	0.500	0-600	0.064
					g.	0.028	90.00	T 0.275	T 0.750			
40-1	1.250	1.200	1.000	0,550	45.0	0.028	90.00		B 0.250	0.500	0.600	0.064
					او	0.028	90.00		T 0.250			
Σ	1.250	1.200	1.000	0.550	45.0	0028	90.00		B onso	0.50p	0.600	0.064
					2	0.028	90.00		T 0.250			,
3	1.250	1.200	1.000	0.550	45.0	0.028			B 0.250	0.500	0.600	0.064
,					0	0.028	90.00		T 0.250			
l	1.250	1,200	1.000	0.550	45.00	0.028		B 0.275		0.500	0.600	0.064

Instrument	: 1-1280-0000	Instrument: 1-000-7161	_Inspector <u>:</u>	235	T, CROOP
Cal Date:	5-24-15-17	Cal Date: 5-24-17	_		
Due Date:	5-24-18	Due Date: 5-24 18	_Date:	18 DEC 17	¥
(OPTICAL COMPARATER	DIGITAL OUT/ENSINE MIC			
	SCHERR - Tunico	0-6" MITUTOYO			



Key. 1 = 100, 8 = 50ttom												
				AS	MACHIN	IED DIMI	NSIONS					
SPECIMEN I.D.	"1.250"	"1.200"	"1.000"	"0.550"	"45.0°"	"0.030"	"90.0°"	"0.275"	"0.250"	"0.500"	"0.600"	"0.064"
						0.028	90.0	T v. 775	Toisso			
48-1	1.250	1.200	1.000	0.550	45.00	0.028	90.00	B 0.275	B 0.250	0.500	0,600	0.064
IL - 7			1.001		, ,	0.028	90.00	T 0,775	T 0.250			
- 2	1.751	1.200	1-000-	0.551	45.0	0.028	9000	B 0. 275	B 0.250	0.500	0.600	0.064
						0.028	90.00	T 0,775	T 0.250			
3_	1.750	1.200	1.000	0.550	45.0	0.028	90.00	B 0.275	B 0.250	0.500	0.600	O. aly
					, c	0.028	90.00		T0.250			
4	1,250	1.200	1.000	0.550	45.0	0,026	10.00	B 0.275	B 0.250	0.500	0.600	0,064
					4. U	0.028	90.00	T 0.275	T 0.250			
4F-1	1.250	1.200	1.000	0,550	45.0	0.028	90.00	B 0.775	B 0.250	0-500	0.60	0.064
					. 0	0.028	90.00		T 0.250			
2	1.750	1.200	1.000	0.550	45.0	0.028	90,00	B 0.275		0.500	0.600	0.064
3					1 . Al	0.028	90.00		T 0.750			,
7	1.250	1.200	1.000	0.550	45.00	0.028	90.00		B 0.750	0.500	0.600	0.064
1.						0.028	90.0		T 0.250			
4	1.250	1.700	1.000	0.550	USS.0'	0.028	,	B 3,275		0.500	0.600	0.064

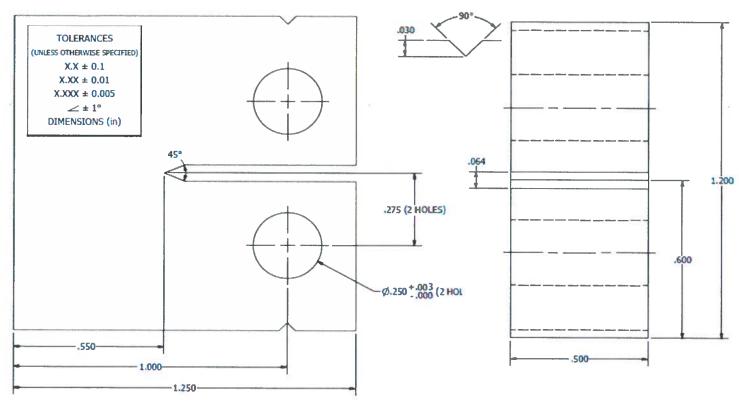
Instrument:	1-1280-0000	Instrume <u>nt:</u>	1-0000-7181	Inspector:
Cal Date:	5-24-17	Cal Date:	5-24-17	_
Due Date:	5-24-18	Due Date:	5-24-18	Date: 18 DSC 17
	TILAL COMPARATOR		TAL BOT/INSIDEMIC	



80	_	_	_	
Kev:	T=	Top.	B =	Bottom

Rey. 1 = 100, 8 = 20ttom												
				AS			ENSIONS					
SPECIMEN I.D.	"1.250"	"1.200"	"1.000"	"0.550"	"45.0°"	"0.030"	"90.0°"	"0.275"	"0.250"	"0.500"	"0.600"	"0.064"
					v	0.028	90.00	T 0.275	T 0.250			
46-1	1.750	1.200	1.000	0,550	45,0	0.018	90.00	B 0.775	B 0.450	0.500	0.600	0.064
						0.018	90.00	T 0.775	T 0:250			
7	1.250	1.700	1.000	0.550	45.0	850.0.		B 0.275	B 0.750	0.500	0.600	0.064
					Li- V	0.028	90.00	T 0.275	T 0,250			
3	1.250	1.200	1.000	0.550	45.0	0.028	90.00	B 0.275	B 0.250	0.500	0.600	0.064
Ч					ı	0.018	90.00	T 0,775	T 0,250			
9	1.250	1.200	1.000	0.550	45.0	0,028	90.00	B 0.77.16	B 0.250	0.500	0.600	0.064
110						0.028	90.00	T 0.775	T 0.250			
44-1	1.250	1.200	1.000	0,550	45.0	0.028	90.00	B 0.275	B 0.250	0.500	8.600	0.064
						0.028	90.00	T 0.278				
2	1.250	1.200	1,000	0.550	15.0	0.028	90.00	B 0.775	B 0.750		0.600	0.064
2					, 0	0.028	90.00	T 0.275	T 0,750			
3	1.250	1.200	1.000	0.550	45.0	0.028	90.00	B 0.775	B 0.250	0.500	0.600	0.064
L				1	, ,	850.0	90.00	T 0.275	T 0-250			
	1.250	1.200	1.000	0.550	45.0	0.028		B 0.275		0.500	0.600	0.064

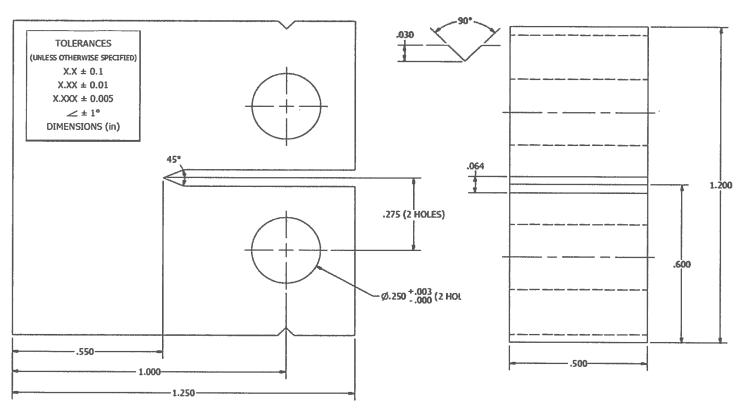
Instrument: 1-1780-0000	Instrument: 1-6000 - 716.1	Inspector:	DIL T. CROOM
Cal Date: 5-24-17	Cal Date: 5-24-17	_	
Due Date: 5-24-18	Due Date: 5-24 -18	Date:	18 DEC 17
OPTICAL COMPARATOR SCHERR TUM.CO	DIGITAL OUT/NSIDE ME		



Key: T = Top, B = Bottom

						06,0-6						
				AS	MACHIN	IED DIMI	NSIONS					
SPECIMEN I.D.	"1.250"	"1.200"	"1.000"	"0.550"	"45.0°"	"0.030"	"90.0°"	"0.275"	"0.250"	"0.500"	"0.600"	"0.064"
11-						0.028	90.00	T 0.275	T 0.250			
4J-1	1.250	1.200	1.000	0.550	215.0	0.028	90.00	B 0.275		0.500	0.600	0.064
					U	0.028	90.00	T 0.275	T 0.250			
7	1.750	1.200	1.000	0.550	450	0.028		B 0.775	B 0.750	0.500	0.600	0.064
				1	2	0.028	9200	T 0.275	T 0.750			
3	1.750	1.700	1.000	0.550	45.0	0,028	90.0	B 0.275	B 0.250	0.500	0-600	0.064
3.4					ď	0.028	90.00	T 0.275	T0.250			
4	1-250	1.700	1.000	01550	45.0	0.028	90.00	B 0,275	B 0,250	0,500	0.600	0.064
13	,					0:078		1				
416-1	1.250	1.200	1.000	0.550	45.00	0.028	90.01	B 0.275	B 0.250	0.500	8.600	0.064
					C	0.028	90.0	T 0.275	T 0.757			
7	1,250	1,700	1.000	0.550	45.0	0.028	90.00	B 0. 775		0.500	0.600	0.064
_		,			, ,	0.028	90.00	T 0.275	T 0.250			
کہ	1.250	1.200	1.000	0.550	45.0	0,018		B 0,275		1.500	0.600	0.064
1.						0.028	90.00		T 0.250			
	1.250	1.200	1.000	0.550	450	0.028	90.00	B 0.275		0.500	2,600	0.064

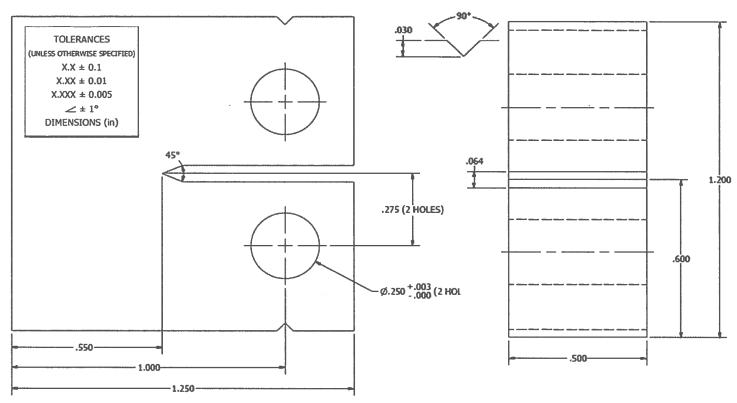
Instrument	: 1-0000-7161	Instrume <u>nt:</u>	1-1281-0000	_Inspector <u>:</u>	7.35 Tickom
Cal Date:	5-24-17	_Cal Date:	5-24-17	_	
Due Date:		Due Date:	5-24-18	_Date:	18 DEC/7
	DIGITAL OUT / NSIDE MIC		OPTICAL COMPARLATOR		
	0-6" mitutorio		SLHERA - TUMICO		



Kow	т –	Ton	D -	Rottom
rev:	=	TOD.	B =	Bottom

						Op, 0						
				AS	MACHIN	IED DIMI	NSIONS					
SPECIMEN I.D.	"1.250"	"1.200"	"1.000"	"0.550"	"45.0°"	"0.030"	"90.0°"	"0.275"	"0.250"	"0.500"	"0.600"	"0.064"
					,	0.028	90.0'	T 0.275	T 0.250			
46-1	1.750	1.700	1.000	0.550	45.0	0,018	90.00	B 0.275		0.500	0.600	0.064
					, 0	0.028	90.00	T 0, 715	T 0.250			
2	1.250	1.700	1.000	0.550	45.0	0.028	. 1		B 0,250	0.500	0-600	0-064
					. ,	0.028	90.00	T0.275	_			
3	1.220	1.700	1.000	0.550	45.0	0,028	90.00	B 0.235		0.500	0.600	0,064
1					٤	0.028	90.00					
4	1.250	1.700	1,000	0.550	45,0	0.028	90.00	B0.275	B 0.250	0.500	0.600	0.064
1.					c	850.0	90.0	T 0.275	T 0.250			
4m.1	1.250	1.200	1.000	0.550	45.0	0.028	90.0"	B 0,245	B 0.250	0-500	0.600	0.064
						0.028	90.00		T 0.250			,
٢	1.750	1.200	1.000	5-550	45.0	0.028	90.00		B 0.250	0.500	0.600	0.064
					, J	0.028	90.00		T 0.250			,
3	1.250	1.200	1.000	0.550	45.0	0.028	90,00	B 0.275		0.500	0.600	0.064
L ₁					, 0	0.028	96.00	T 0.275				
	1.250	1.700	1.000	0.550	45.0	0.028	90.0°	B 0.275		0.5w	0-600	0.064

Instrument:	Instrument: 1-0000 - 7/6/	Inspector:	735 Tickou.
Cal Date: 5-2 4-17	Cal Date: 5-2 y - 17		
Due Date: 5-24-18	Due Date: 5 211 -18	_Date:	1808617
OPTICAL COMPARATER	DIGITAL OUT/INSIDEMIC		

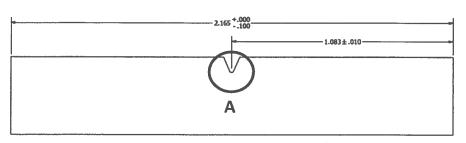


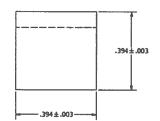
Key: T = Top, B = Bottom

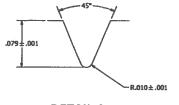
					Cy. 1 - 1	ор, в – с	0000111					
				AS	MACHIN	ED DIMI	NSIONS					
SPECIMEN I.D.	"1.250"	"1.200"	"1.000"	"0.550"	"45.0°"	"0.030"	"90.0°"	"0.275"	"0.250"	"0.500"	"0.600"	"0.064"
					8	0.028	90.00	T 0.275	T 0.250			
40-1	1.251	1.700	1.001	0.551	45.0	0.028	9000	B 0. 275	BQ50	0.500	0.600	0.064
					,	0.078	90.00	T 0. 275	T0,250			'
2	1.250	1.700	1.000	0.550	45.0	0.028	90.00	BO. 275	B 0.250	0.500	0-600	O. Oldy
					,	0.028	90,00	T 0.275				
3	1-250	1.200	1.000	0,550	45.0	0.028		B 0.275	B0,250	0-500	0.600	0.064
			,		v	0.028	90.00	T 0.275	T 0.250			,
4	1.750	1.700	1.000	0.550	45.0	0.028	90.0	B0.775	B 0.750	0.500	0.600	0.064
								Т	T			
								В	В			
								Т	Τ			
								В	В			
								Т	Т			
								В	В			
								Т	Т			
								В	В			

nstrument:	1-1281-0000	Instrument: /- 0000 - 7761	_Inspector:	7.35 F. Chap.
Cal Date:	5-24-17	Cal Date: 5-24-17	_	
Due Date:			_Date:	18 DLC 17
	OPTICAL COMPARATO	0-6" mITUTOYO		

Block CF







TOLERANCES
(UNLESS OTHERWISE SPECIFIED) $X.X \pm 0.1$ $X.XX \pm 0.01$ $X.XXX \pm 0.005$ $\angle \pm 1^{\circ}$ DIMENSIONS (in)

DETAIL A

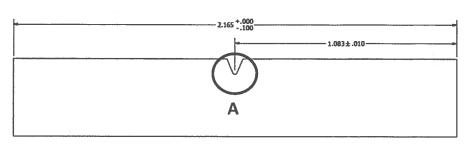
Key: W = Width, H = Height

			Ke	y: W = Width	n, H = Height			
		_	AS	MACHINED I	DIMENSIONS			
SPE	CIMEN I.D.	"2.165"	"1.083"	W "0.394"	H "0.394"	"0.079"	"45.0°"	"R0.010"
ř <i>f</i>	7 05	2.150	1.075	0.346	0.395	0.079	45.0"	0.010
	06	2.150	1.075	0.396	0.392	0.079	45.0"	0.010
	07	2.150	1.075	6.396	6.343	0.079	45.0	0.010
	08	2.147	1.073	0.396	0,394	0,079	45.00	0.010
	10	2.148	1.074	0.396	6.395	0.079	45.0	0.010
	11	2.148	1.074	0.396	0.395	6.079	45.00	0.010
	12	2.147	1.073	0.394	0.395	0.080	45.0	0,010
	13	2.147	1.073	0.34 6	0.394	0.080	45.0	0.010
	14	2.148	1.074	0.394	0.396	0.080	45.00	0.010
	15	2.147	1.073	0.394	0.396	0.080	45.0	0.010
	16	2.147	1.073	0.394	0.395	0.080	45.0	0.010
	17	2.147	1.073	0.394	0.395	0.080	45.0	0.010
	18	2.152	1.076	6.394	0.395	0.080	415.00	0,010
	19	2.147	1.073	0.394	0.395	0.080	45.0	0.010
	- 20	2.147	1.073	0.345	0.396	0.080	45.0	0.010

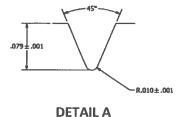
Instrument: 1-0000 - 7161 Instrument: 1-0000 - 1280 Inspector: 7.2000

Due Date: 5-24-18 Due Date: 5-24-18 Date: 12 mail 18

DIGITAL MIC OPTICAL COMPARATOR







TOLERANCES (UNLESS OTHERWISE SPECIFIED) $X.X \pm 0.1$ $X.XX \pm 0.01$ $X.XXX \pm 0.005$ ∠ ± 1° **DIMENSIONS (in)**

Key: W = Width, H = Height

					,	,,			
				AS	MACHINED (DIMENSIONS			
S	SPECIM	IEN I.D.	"2.165"	"1.083"	W "0.394"	H "0.394"	"0.079"	"45.0°"	"R0.010"
F	-A	15	2.147	1.073	0.315	0.395	0.080	45.0	0.010
L	<u></u>	22	2.147	1.073	0.395	0.395	0.040	45.0"	0.010
LE	<u>-c</u>	OZ	2.150	1.075	6.395	0.396	0.078	45.0	0.010
L		03	2.149	1.074	0.396	0.395	ۇ √ ت ن	450	0.010
		04	2.147	1.073	0.246	0.395	0.078	45.0	0.010
_		05	2.150	1,075	0.390	0.745	0.078	45.0'	0.010
L		06	2.150	1.075	0,396	0.393	0.078	45.0"	0.018
L		07	2.149	1.074	0.316	0-395	0.078	45.0	0 010
L		08	2.148	1.074	0.394	0.395	0.078	45.0	0.010
		09	2.150	1.075	0.396	0.395	0.078	45.0	0.010
		10	2.148	1.074	0.396	0.395	0.078	45.00	0.010
		11	2.149	1.074	0.394	0.295	0.078	45,00	0.010
		17	2.148	1.674	0.396	0.395	6.078	45.0	0-010
		13	2.148	1074	0.396	0.795	0.078	45.0	0.010
			5 11.9					1 4	

14 2.141 1.074 0.391 0.395 0.078 45.0 0.40

ment: 1-0000-7161 Instrument: 1-0000-1280 Inspector: 2.345 7.02000

Cal Date:

5-24-17

Cal Date: 5-24-17

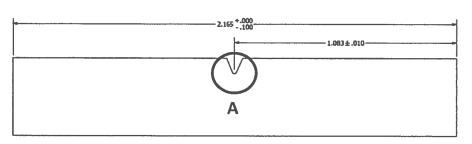
Due Date:

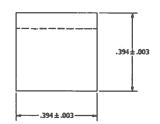
5-24-18 Due Date: 5-24-18 Date:
DIGITAL MIC OPTICAL COMPARATOR

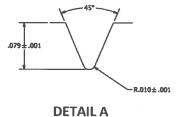
12 MA,2 18

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College - Fire on







TOLERANCES
(UNLESS OTHERWISE SPECIFIED) $X.X \pm 0.1$ $X.XX \pm 0.01$ $X.XXX \pm 0.005$ $\angle \pm 1^{\circ}$ DIMENSIONS (in)

Key: W = Width, H = Height

			AS	MACHINED	DIMENSIONS			
SPEC	IMEN I.D.	"2.165"	"1.083"	W "0.394"	H "0.394"	"0.079"	"45.0°"	"R0.010"
Ī-(15	2.148	1.074	0.396	0.395	0.078	45.0 Te	0-010
	16	2.150	1.075	0.396	0.395	0.078	45.0	0.010
Щ	17	2.148	1.074	0.396	0.395	0.078	45.0	0.010
	18 .	2.147	1.073	0.396	0-395	0.078	45.00	0.010
	19	2.147	1.073	0.396	0.395	0.078	45.00	0.010
	20	2.147	1.073	0396	0.395	0.078	45.0	0.010
	121	2.147	1.073	0:396	0.395	0.078	45.00	0.010
FE	- 02	2.147	1.073	0.395	0.395	0.079	45.00	0.010
	03	2.150	1.075	0.395	0.315	0.079	45.00	0.010
	04	7.148	1.074	0.397	0.395	0.079	45.0"	0,010
	05	7.150	1.075	0.394	0.395	0.079	45.0°	0.010
	06	2.147	1.073	0.394	6.395	0.079	45.0	0.010
	07	2.148	1.074	0.394	0.395	0.079	45.0	0.010
	08	2.147	1.073	0.394	0.394	0.079	45.00	0.010
	09	2.147	1.073	0.395	0.294	0.079	45.0	0.010

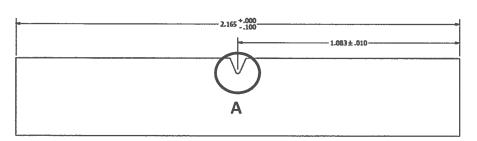
Instrument: 1-0000-7161 Instrument: 1-0000-1280 Inspector: 7-7c T. Cizach

Due Date: 5-14-18 Due Date: 5-14-18 Date: 12 mar 18

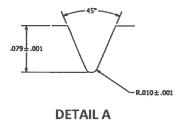
Due Date: 5-24-18 Da

DIGITAL MIC OPTICAL COMPARATOR

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TOLERANCES
(UNLESS OTHERWISE SPECIFIED) $X.X \pm 0.1$ $X.XX \pm 0.01$ $X.XXX \pm 0.005$ $\angle \pm 1^{\circ}$ DIMENSIONS (in)

Key: W = Width, H = Height

				MACHINED [
SPE	CIMEN I.D.	"2.165"	"1.083"	W "0.394"	H "0.394"	"0.079"	"45.0°"	"R0.010"
FE	10	2.144	1,074	0.394	0.395	0.079	45.0°	0.010
	11	2.144	1.074	0.315	0.394	0.079	45.00	0.010
	12	2.148	1.074	0.795	0.395	0.079	45.0"	0.010
	13	2.149	1.074	0.395	0.76	0.079	45.0'	0.010
	14	2.148	1.074	0.395	0.394	0.079	45.0'	0.016
	15	2.147	1.073	0.395	0.394	0.079	45.00	0.010
	ماا	2.149	1.074	0.394	0.394	0.079	45.0'	o.vid
	17	2.148	1.074	6.315	0.394	0.079	450	0.010
	18	2.148	1.074	0.394	0.394	0.079	45.00	0,010
	19	2,147	1.073	0.394	0.394	0.079	45.00	0.010
	20	2.148	1.074	0.395	0394	0.079	45.0	0.010
	1 21	2.147	1.073	0.395	0.344	0.079	45.0	0.010
FG	, 02	2.153	1.076	0.395	0.395	0.078	45.00	0.010
	03	2.153	1.074	0.394	0.394	0.078	45.0	0.010
	104	2.148	1.074	0.394	0.394	0.078	45.0'	0.010

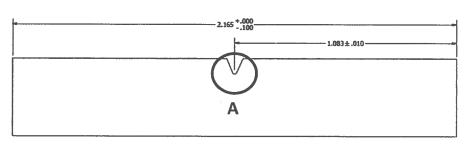
Instrument: 1-0000-7161 Instrument: 1-0000-1280 Inspector: 7.0000

Cal Date: 5-24-17 Cal Date: 5-24-17

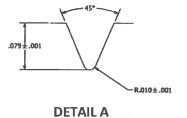
Due Date: 5-24-14 Due Date: 5-24-18 Date: 12 MAIL 18

DIGITAL MIC OFTICAL COMPARATOR

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TOLERANCES
(UNLESS OTHERWISE SPECIFIED) $X.X \pm 0.1$ $X.XX \pm 0.01$ $X.XXX \pm 0.005$ $\angle \pm 1^{\circ}$ DIMENSIONS (in)

Key: W = Width, H = Height

	AS MACHINED DIMENSIONS SPECIMEN I.D. "2.165" "1.083" W "0.394" H "0.394" "0,079" "45.0°" "R0.010"												
SPE	CIMEN I.D.	"2.165"	"1.083"	H "0.394"	"0.079"	"45.0°"	"R0.010"						
F	05	7.153	1.076	0.394	0.394	0.078	45.0	0.010					
	06	2.154	1.077	0.394	0.394	0.077	45.0"	0.010					
	07	2.153	1.076	0.344	0.394	0.078	45.00	0.010					
	08	2.153	1.076	0.394	0.394	0.078	45.00	0.010					
	09	2:153	1.076	0.394	0.394	0.078	45,00	0.010					
	10	2.153	1.074	0.394	0.394	0.078	45.0	0.010					
	11	2.150	1.076	0.394	0.394	6.078	215.0°	0.010					
-	12	7.153	1.076	0.394	0.394	0.078	45.00	0.010					
	13	2.144	1.074	0.394	0.394	0.078	45.0"	0.010					
	14	2.151	1.075	0,394	0.394	0.078	45.0	0.010					
	15	2.148	1.074	0.394	0.394	0.078	45.0	0.010					
	14	7.151	1.075	0.394	0.394	0.078	45.0"	0.010					
	17	2.150	1.075	0.394	0.394	0.078	45.0	0.010					
	18	2.125	1.076	0.394	0.394	0.078	45.0	0.010					
	119	2.151	1.075	0.394	0.344	0.078	45.00	0-010					

Instrument: 1-0000 - 7161 Instrument: 1-0000 - 1780 Inspector: 736 T. (Room

Cal Date: 5-24-17 Cal Date: 5-24-17

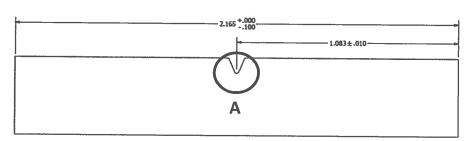
17-1-11

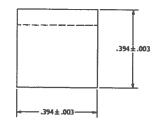
Due Date: 5-24-18 Due Date: 5-24-18 Date:

DIGITAL MIC OPTICAL COMPACATOR

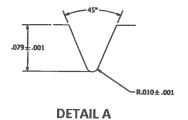
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TOLERANCES
(UNLESS OTHERWISE SPECIFIED) $X.X \pm 0.1$ $X.XX \pm 0.01$ $X.XXX \pm 0.005$ $\angle \pm 1^{\circ}$ DIMENSIONS (in)

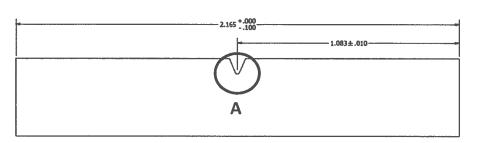
Key: W = Width, H = Height

	AS MACHINED DIMENSIONS												
SP	ECIMEN I.D.	"2.165"	"1.083"	W "0.394"	H "0.394"	"0.079"	"45.0°"	"R0.010"					
Ē	-6 ZO	2.151	1.075	0.394	0.394	0.078	45.0	0.010					
	21	2.150	1.075	0.394	0.394	0:078	45.0	0:010					
F	I or	2.165	1.087	U.395	0.395	0.078	45.00	0.010					
	03	2.165	1.082	0.395	0.395	0.078	45.00	0.010					
	04	2.145	1.082	0.396	0.315	0.078	45.00	0.010					
L	05	2.145	1.087	0.395	0.394	0.078	45,00	0.010					
	04	7.145	1.082	0.395	0.314	0.078	45.00	0.010					
	07	2.165	1.087	0.396	0.396	0.078	45.0	0.010					
	08	2.145	1.082	0.384	0.396	0.078	45.0	0.010					
	09	7.165	1.082	0.394	0.396	0.078	45.00	0.010					
	10	2.165	1.082	0.394	0.396	0.078	45.0	0.010					
	11	2.165	1.087	0.396	0.396	0.078	45.0	0.010					
Ш	12	2.165	1.087	0.396	0.394	0.078	45.0'	0.010					
	13	2.145	1.082	0.396	0.396	0.078	45.0	0.010					
	14	2.165	1.087	0.394	0.396	0.078	45.00	0.010					

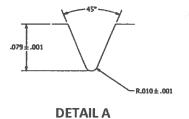
Instrument: 1-0000 - 7161 Instrument: 1-000 - 1780 Inspector: 5-24-17 Cal Date: 5-24-17

5-24-18 Due Date: 5-24-18 Date

A-L" MITHTAUL SCHERR. TUM.







TOLERANCES (UNLESS OTHERWISE SPECIFIED) $X.X \pm 0.1$ $X.XX \pm 0.01$ $X.XXX \pm 0.005$ ∠ ± 1° **DIMENSIONS (in)**

Key: W = Width, H = Height

	AS MACHINED DIMENSIONS SPECIMEN I.D. "2.165" "1.083" W "0.394" H "0.394" "0.079" "45.0°" "R0.010"												
SPECIMEN I.D. "2.165" "1.083" W "0.394" H "0.394" "0.079" "45.0°" "I													
F	I 15	2.165	1.082	0.396	0.396	0.078	45.0	0.010					
	14	2.165	1.082	0.394	0.396	0.078	45,0	0.010					
	17	2.165	1.082	0.396	0.396	0.078	45.00	0.010					
	18	7.165	1.082	0.396	0.396	0.078	45.0	0.010					
	19	2.165	1.082	0.316	0.314	0.078	45,0	0.010					
	20	2.165	1.082	0.396	0.396	0.078	45.0	0.010					
	, 21	2.165	1.082	0.396	0.394	0.078	45,0	0.010					
F	6 02	2.165	1.087	0.396	0.396	0.079	45,0	0.019					
	03	2.165	1.082	0.396	0.346	0.079	2/5,00	0.010					
	04	7.145	1.087	0.386	0.396	0.079	45.0	0.010					
	0.5	2.165	1.087	0.396	0.396	0.079	45.0	0.010					
	06	2.165	1.082	0.396	0.396	0.079	45.0	0,010					
	07	5.165	1.087	0.344	0.394	0.079	45.0	0.010					
	08	2.165	1.087	0.396	0.396	0.079	45.00	Ü-010					
	09	2.165	1.082	0.396	0-316	0.071	e/5.0	0.016					

Instrument: 1-0000 - 1780 Inspector: 7.32 Instrument: 1-0000-7161

Cal Date:

5-24-17

Cal Date:

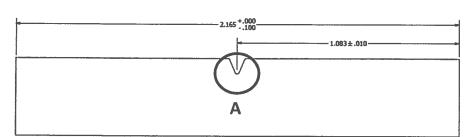
Due Date:

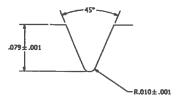
Due Date:

Date:

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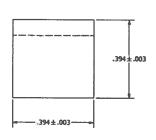
DIGITAL MIC





DETAIL A

TOLERANCES (UNLESS OTHERWISE SPECIFIED) $X.X \pm 0.1$ $X.XX \pm 0.01$ $X.XXX \pm 0.005$ ∠ ± 1° DIMENSIONS (in)



* SPECIMEN HAS WIRE BURN Across Botton of Sample PERPENDICULAR TO NOTCH.

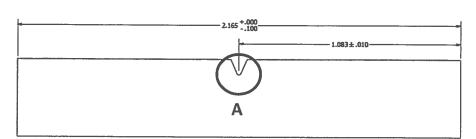
Key: W = Width, H = Height AS MACHINED DIMENSIONS											
				MACHINED I	DIMENSIONS						
SPECI	MEN I.D.	"2.165"	"1.083"	W "0.394"	H "0.394"	"0.079"	"45.0°"	"R0.010"			
FK	10	2.145	1.087	0.396	0.396	0.079	45.0	0.010			
	11	2.165	1.087	0,396	0.314	0.079	45.0"	0.010			
	12	2.165	1.087	0.396	0.394	0.079	45.0	0.010			
	13	2.165	1.087	0.346	0.396	0.079	45.0	0.010			
	14	2.165	1.082	0.396	0.396	0.079	450	0.010			
	15	2.165	1.087	0.396	0.396	0.079	45.0	0.010			
	16	2.145	1.082	0.396	0.396	0.079	45.0	0.010			
	17	2.165	1.087	0.396	0.394	0.079	45.0	0.010			
	18	2.165	1.087	0.396	0.396	0.079	45.0	0.010			
	19	2.165	1.087	0.396	0.396	0.079	45.0	0.010			
	20	2.165	1,082	0.396	0.396	0.079	45.0	0.010			
	15,	2.145	1.082	0.396	0.396	0.079	45.0	0.010			
FM	02	2.165	1.082	0.396	0.396	0.078	45.0	0.018			
	03	2.165	1.082	396.0	0.396	0.078	45.0	0.010			
↓	04	2.165	1.082	0.396	0.346	0.078	45.00	0,010			

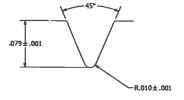
Instrument:	1-0000 - 7161	Instrument: _	1-0000-1280	Inspector:	2. 36 Tickoon
Cal Date:	5-24-17	Cal Date:	5-24-17		
Due Date:	5-24-18	Due Date: _	5-24-18	Date:	12 MAIR 18

Due Date: DIGITAL MIL

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OPTICAL COMPARATOR C/11/22 -





 $X.XXX \pm 0.005$ ∠ ± 1° **DIMENSIONS (in) DETAIL A**

.394 ± .003 -.394±.003-

NOTE 1 - SPECIMEN REJECTED DUC TO WIDTH BEING CUT THIN. DUE TO INCLUSION

Key:	W	=	Width,	H =	Height
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TOLERANCES

(UNLESS OTHERWISE SPECIFIED) $X.X \pm 0.1$ $X.XX \pm 0.01$

				AS	MACHINED (DIMENSIONS			
	SPECIMEN I.D.		"2.165"	"1.083"	W "0.394"	H "0.394"	"0.079"	"45.0°"	"R0.010"
	FIV	a 5	2.165	1.082	0.396	0.396	0.078	45,0	0.010
NOTE 1-7		06	2.165	1.082	0.326 12	0.394	0.078	45.0	0.010
		07	2.165	1.082	0.396	0.396	0.078	45.0	0.010
	(08	7.165	1.082	0.396	0.396	0.078	45.0	0.010
		29	2.165	1.087	0.396	0.396	0.078	45.0	0.010
		10	2.165	1.087	0.396	0.396	0.078	45.0'	0.010
		1	2.165	1.082	0.396	0.394	0.078	45.0"	0.010
	1	7	2.165	1.087	0.396	0.394	0.078	45.0	0.010
		13	2.165	1.082	0.396	0.396	0.678	45,0	0.010
)	14	2.165	1.082	0.396	0-396	0.078	45:0	0.010
		15	2.165	1.082	0.796	0.394	0.078	45.0	0.010
)	16	2.165	1.082	0.396	0-394	0.078	45.0	0.010
		7	2.165	1.087	0.394	0.396	0.078	45.0	0.010
		18	2.165	1.087	0.396	0.396	0.075	45.0	0.010
l		19	2.165	1.082	0.396	0.396	0.078	45.0	0.010

Instrument:

1-000C - 716| Instrument: j-00°C - 1280 Inspector:

Cal Date:

5-24-17 Cal Date: 5-24-17

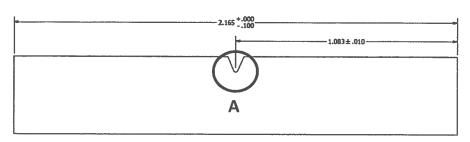
Due Date:

5-24-18 Due Date: 5-24-18 Date:

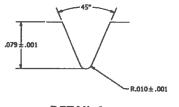
12MA218

DIGITAL MIL A-1. " MITUTANIA OPTICAL COMPARATOR

CALIEDS - Time







TOLERANCES (UNLESS OTHERWISE SPECIFIED) $X.X \pm 0.1$ $X.XX \pm 0.01$ $X.XXX \pm 0.005$ ∠ ± 1° **DIMENSIONS (in)**

DETAIL A

Kev: W = Width, H = Height

	AS MACHINED DIMENSIONS											
				MACHINED I	DIMENSIONS	_						
SPE	CIMEN I.D.	"2.165"	"1.083"	W "0.394"	H "0.394"	"0.079"	"45.0°"	"R0.010"				
E	M ZO	7.165	1.087	0.396	0.396	0.078	45.0	0,010				
	15 1	2.165	1.082	0.396	0.394	0.078	45.0	0.010				
F	0 02	2.165	1.082	0.396	0.395	0.078	45.0	0.010				
	<u>03</u>	2.145	1.087	0.396	0.395	0.078	45.0	0.010				
	04	7:145	1.087	0.396	0.395	0.078	45.0	0.010				
	05	2.165	1.082	0.394	0.395	0.078	45.00	0.010				
	06	2.165	1.082	0.316	0.395	0.078	45.0	0.010				
	07	2.165	1.082	0.394	0.315	0.078	45.0	0.010				
	og	2.165	1.082	0.396	0.315	0.078	45,00	0.010				
	09	2.145	1.087	0.396	0.315	0.078	45:0'	0.010				
	10	2.145	1.082	0.396	0.395	0.078	45.0	0.010				
	11	2.145	1.087	0.396	0.395	0.078	45.0'	0.010				
	12	2.165	1.087	0.396	0.315	0.078	45.0	0.010				
	13	2.165	1.082	0.396	0.315	0.078	45.00	0.010				
	114	2.165	1.082	0.396	0.345	0.078	45.0	n.010				

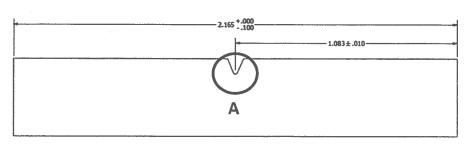
1-0000-7161 Instrument: 1-0000-1280 Inspector: 35 T. czam Instrument:

5-24-7 Cal Date: 5-24-17 Cal Date:

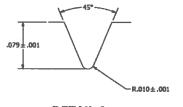
5-24-18 Due Date: 5-24-18 Date: 12 MAIZ 118

DIGITAL MIC OPTICAL COMPARATOR Due Date:

n-1.1' -- -- ... (14010 - T. 1 /1







TOLERANCES (UNLESS OTHERWISE SPECIFIED) $X.X \pm 0.1$ $X.XX \pm 0.01$ $X.XXX \pm 0.005$ ∠ ± 1° DIMENSIONS (in)

DETAIL A

Key: \M = \Midth H = Height

Key: W = Width, H = Height AS MACHINED DIMENSIONS												
			AS	MACHINED [DIMENSIONS							
SPEC	IMEN I.D.	"2.165"	"1.083"	W "0.394"	H "0.394"	"0.079"	"45.0°"	"R0.010"				
F	0 15	2.165	1.082	0.396	0.395	0.078	45.0	0.010				
	16	2.165	1.082	0.396	0.395	0.078	45.0	0.010				
	17	7.165	1.082	0396	0.395	0.078	45.0	0.010				
	18	2.165	1.08)	0.396	0.345	0.078	45.0	0,010				
	. 19	7.165	1.082	0.396	0.395	0.078	2/5.0	0:010				
	20	2.165	1.087	0.396	0.395	0.078	45.0	0.010				
,	151	2.165	1.082	0.396	0.395	0.078	45.0	0.010				
F (202	2.165	1.087	0.396	0.396	0.079	45.0	0.010				
	63	2.165	1.082	0.396	0.3%	0.079	15.0	0.010				
	04	2.165	1.082	0.396	0.396	0.079	45.0	0.010				
	05	7.165	1.087	0.394	0.396	0.079	1/5.00	0.010				
	06	2.165	1.087	0.396	0.396	0.079	45.0	0.010				
	07	2.165	1.087	0.396	0.396	0.079	45.0	0,010				
	08	2.165	1.087	0.396	0.396	0.079	1/5.00	0.010				
	,09	2.165	1.082	0.396	0.396	0.079	215.0	0.010				

1-0000 - 7161 Instrument: 1-0000 - 1280 Inspector: Instrument:

Cal Date:

5-24-17 Cal Date: 5-24-17

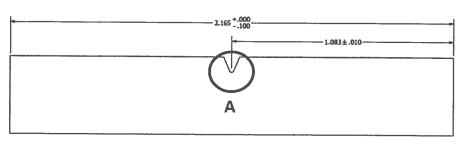
DIGITAL MIL OFFICE SOLVER Date:

DIGITAL MIL OFFICE SOLVER DATE: Due Date:

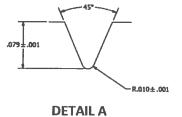
A-1." M. TITALIN

Cellens Tunice

12 MARIX







TOLERANCES (UNLESS OTHERWISE SPECIFIED) $X.X \pm 0.1$ $X.XX \pm 0.01$ $X.XXX \pm 0.005$ ∠ ± 1° **DIMENSIONS (in)**

Key: W = Width, H = Height

	AS MACHINED DIMENSIONS												
SPE	CIMEN I.D.	"2.165"	"1.083"	W "0.394"	H "0.394"	"0.079"	"45.0°"	"R0.010"					
F	Q 10	2.165	1,087	0.396	0.394	0-079	45.0	0.010					
	11	7.165	1.082	0.790	0-396	0.079	45,0	0.010					
	וז	2.165	1.087	0.396	0.314	0.079	4500	5.010					
	13	2.145	1.082	0.396	6.396	0.079	45,0	0.010					
	14	7.165	1.082	0-316	0.396	0.079	45.0	0,010					
	15	2.165	1.082	0.396	0.391,	0.079	45.0	0.010					
	16	2.165	1.082	0.396	0.396	0.079	45.00	0.010					
	17	5.165	1.082	0.396	0-396	0.079	45.0	0.010					
	18	2.145	1.082	0.396	0.314	0.079	45.00	0.010					
	19	2.165	1.087	0.396	0.396	0.079	45.00	0.010					
	20	2.165	1.082	0.396	0.396	0.079	45.00	0.010					
	151	2.165	1.082	0.396	0.396	0.079	45.0	0.011)					

Instrument:

1-0000-7161

Instrument: 1-0000-1280 Inspector: 77 - T. CRAS.

Cal Date:

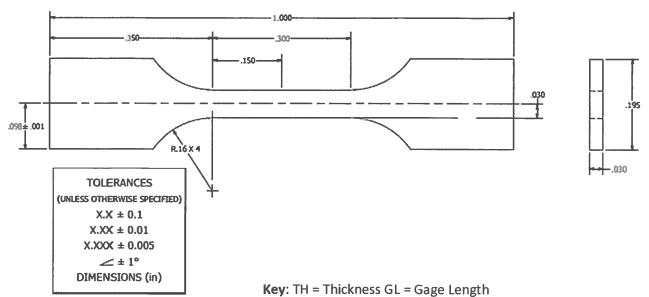
Cal Date: 5-24-17

Due Date:

Due Date: 5 - 24 - 18 Date:

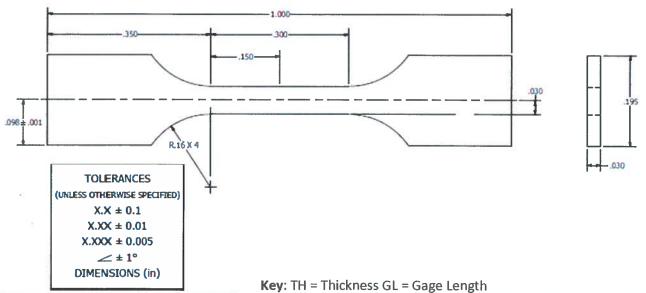
12 MAR 18

OPTICAL COMPARATO returno. Tun. ra



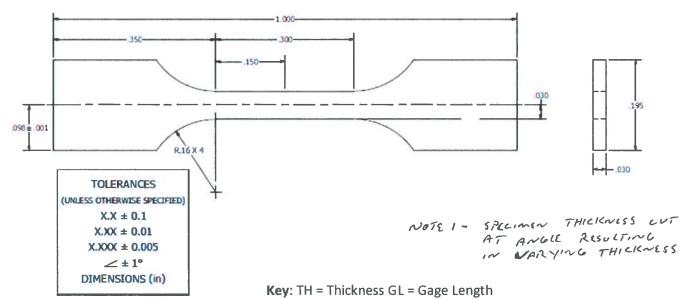
AS MACHINED DIMENSIONS												
SPECIMEN I.D.	"1.00"	"0.195"	"0.350"	"0.300"		.16"	GL "0.060"	TH "0.030"				
FA03 - 11	0.99	0.195	0.348	0.298	0-16	0.16	0.058	0.630				
12	0.99	0.145	0.148	0.248	0.16	0.16	0.05%	0.030				
13	0.99	0.195	0.348	0.298	0.16	9.16 0.16	0.058	0.030				
الر	0.49	0.145	0.348	0.298	0.16	0.16	6.054	0.630				
15	0.99	0.195	0.348	0.218	0.16 n.16	0.16	820.6	C.030				
16	0.99	0.195	0.348	0.798	0.16	0.16	0.058	0.030				
17	0,49	0.195	0.348	0.298	0.16	0.16	0.058	0.030				
18	0.99	0.195	0.348	0.298	0.16	0.16	0.058	0.030				
							-					
							_					

MITUTOYO SCHERL - TUMICO



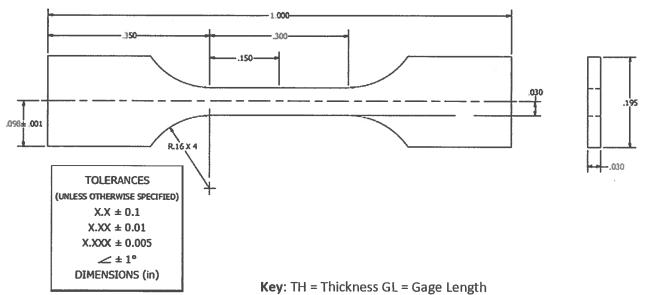
AS MACHINED DIMENSIONS											
SPECIMEN I.D.	"1.00"	"0.195"	"0.350"	"0.300"	"RC).16"	GL "0.060"	TH "0.030"			
FA22 - 21	1.00	6.195	0.350	0.300	0.16	0.16	0.060	0.030			
27	1.00	0.195	0,350	6.300	0.16	0.16	0.060	0.030			
73	1.00	0.145	0.350	o.Yo	0.16	0.16	0.060	0.030			
24	1.00	0.195	0.350	0.300	0.16 2.16	0.16	0.040	0.030			
75	1.00	0.195	0,350	0.300	0.16	0.16	5.00	0.030			
24	1.00	0.195	0.350	0.300	0.16	0.16	0.060	0.030			
27	1.00	0.195	0.350	0.306	0.16	0.16	0.060	0.030			
28	1.00	0.195	0.350	0.300	0.16	0.16	0.060	0.036			
							_				
		į į									

Instrument: 1-0000-1280 Instrument: Inspector: 1-0000-7161 Cal Date: Cal Date: 5-24-17 5-24-17 Due Date: 9 A.212 18 Due Date: Date: 0-6" DIGITAL MIL OPTICAL COMPHILITICIL ScHCRR - Tumica MITUTOYO



AS MACHINED DIMENSIONS SPECIMEN I.D. "1.00" "0.195" "0.350" "0.300" "R0.16" GL "0.060" TH "0.030" 0.16 0.16 FC01 - 11 0.058 0.195 0.300 0.030 0.350 0.14 0.16 1.00 0.16 0.16 0.16 12 0.058 0.030 1.00 0.195 0.350 0.300 0.16 0.16 0.16 0.195 13 1.00 0.350 0.300 0.14 0.16 0.030 0.058 0.16 0.16 0.058 0.350 0.300 1.00 0.16 14 0.195 0.16 0.030 0.16 0.16 0.300 15 1.00 0.030 0.195 0.350 0.16 0.058 0.16 0.16 0.16 0.058 0.145 16 1.00 0.300 0.350 0.16 0.030 0.16 0.16 0.16 1.00 0.350 0.300 0.195 0.16 0.16 0.058 0.030 0.16 0.16 14 0.350 0.300 0.16 0.058 1.00 0.195 0.16

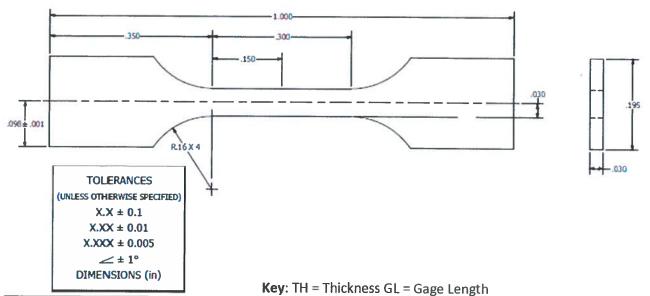
Instrument:	1-0000-7161	_Instrument:	F0000-1280	Inspector:	2307.1100
Cal Date:	5-24-17	Cal Date:	5-24-17		,
Due Date:	5-24-18	Due Date:	5-24.18	Date:	12 APIZ 18
	O-4" DIGITAL MI	<u>.</u>	OPTICAL COMPARA	TOR	
	m1707010		SCHERIZ - Tumico	<i>;</i>	



AS MACHINED DIMENSIONS									
SPECIMEN I.D.	"1.00"	"0.195"	"0.350"	"0.300"	"R0.16"		GL "0.060"	TH "0.030"	
FC 22 - 21	1.00	0./45	0.350	0.300	0.16	0.16	6.058	6.030	
22	1.00	0.185	0.350	6.300	0.16	0.16	0.058	0.030	
73	1.00	0.195	0.350	0.300	0.16	0.16	0.05%	0.030	
24	1-00	0.195	0.350	0.500	0.16	0.16	0.058	0.030	
75	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0.030	
24	1.00	0.145	0.350	0.300	0.16	0.16	0.058	0.030	
27	1.00	0.145	0-350	0.300	0.16	0.16	0.058	0.030	
28	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0.030	
				e.					

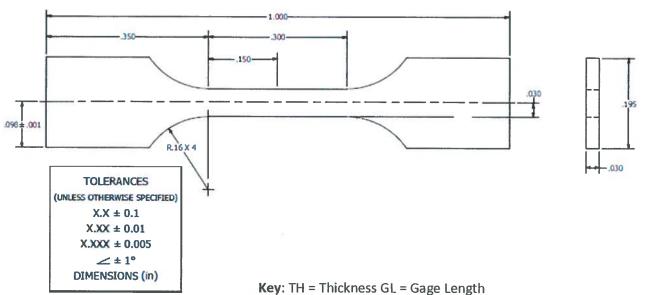
Instrument: 1-0000 - 1280 Instrument: Inspector: 1-0000-7161 5-24-17 Cal Date: 5-24-17 Cal Date: Due Date: Due Date: Date: 5-24-18 12A1218 OPTICAL COMPARATOR SCHEZIZ - Tumico MITUTOYO

Zion SS3 Specimen

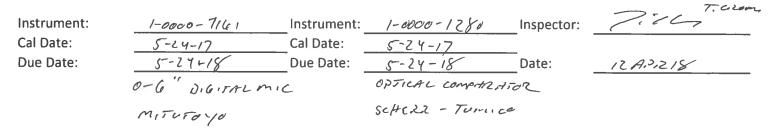


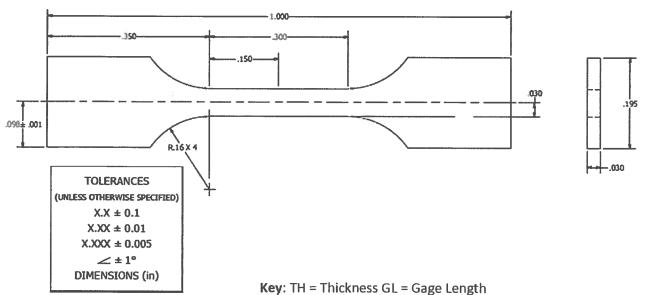
AS MACHINED DIMENSIONS									
SPECIIVIEN I.D.	1.00	"0.195"	"0.350"	"0.300"	"R0.16"		GL "0.060"	TH "0.030"	
					0.16	0.16			
FE01-11	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0.030	
					0.16	0.16			
15	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0.030	
					0.16	0.16			
13	1.00	0.195	6.350	0.300	0.16	0.16	0.058	0.030	
18. 1				_	0.16	0.16			
14	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0.030	
					0.16	0.16			
15	1.00	0.195	0.350	0.300	0.16	0.16	1.058	0.030	
					0.16	0.16			
16	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0.030	
	,				0.16	0.16			
17	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0.030	
					0.16	0.16			
18	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0.030	
		8	7/						
							1 1		
			1				1		

Instrument:	=	1-0000-7161	Instrument:	1-0000-1280	Inspector:	Z T.C. COM
Cal Date:		5-24-17	Cal Date:	5-24-17		
Due Date:		5-24-18	Due Date:	5-24-18	 Date:	12AD218
	0-6" DIGGARMIC			OPTICAL COMPARA	Ten	
	M	11505070	9	scherr - Tumica	-	



AS AAA CHINIED DIA SSUSIONS									
AS MACHINED DIMENSIONS									
SPECIMEN I.D.	"1.00"	"0.195"	"0.350"	"0.300"	"R0.16"		GL "0.060"	TH "0.030"	
					0.16	0.16			
FE 55-51	1.00	0.195	0.350	6.300	0.14	0.16	0.058	0.030	
		5 170	330	0.500	1	 		0.030	
77	1 00	0.195	. 25	20-	0.16	0.16	- ,	0.030	
22	1.00	0.775	0.350	0.300	0.16	0.16	0.058	0.030	
					0.16	0.16	_	:	
13	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0.030	
	34				0.16	0.16			
24	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0.000	
	-				0.16	0.16			
25	1.00	0.195	0.3511	0.300	0.16	0.16	1.058	0.030	
					0.16	0.16			
26	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0.030	
			5 - 5 5	0.5		1	- 0	30	
١ ٢٦	/ 0-	- 101-	0.350	0.300	0.16	0.16	0.058	0.030	
<u> </u>	1.00	0.195	0.330	0.300	0.16	0.16	0.038	0.030	
31/	8		. 2 -	_	0.16	0.16	_	_	
58	1.00	8.195	0.350	0.300	0.16	0.16	0.058	0.030	
							7		
						<u> </u>	1		
			-		-	-			
1.1		l					-		

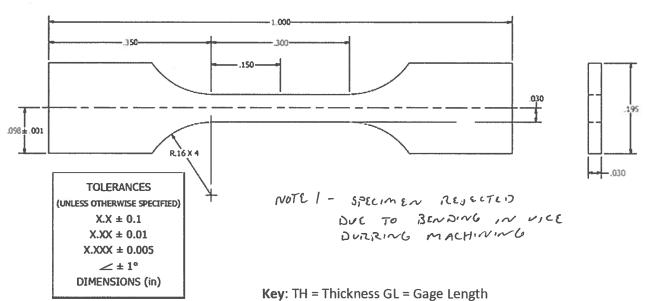




				NED DIMENS				
SPECIMEN I.D.	"1.00"	"0.195"	"0.350"	"0.300").16"	GL "0.060"	TH "0.030"
					0.16	0.16		
FG01 - 11	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0.030
					0.16	0.16		
12	1.00	0.195	0.350	0.300	0.14	0.16	0.058	0.030
					0.16	0.16		
13	1.00	0.195	0.350	0.300	0.14	0.16	0.058	0.030
		33	,		0.16	0.16	- "	
14	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0.030
15-					0.16	0.16		
15	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0.030
	,				0.16	0.16	_	
16	1.00	0.195	0.350	0.300	0.16	.0.16	0.058	0.030
		0	3		0.16	0.16		
17	1.00	0.195	0.350	0.300	0.16	0.14	0.058	0.030
15/					0.16	0.14	_	
18	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0.030
							_	
							_	
							_	

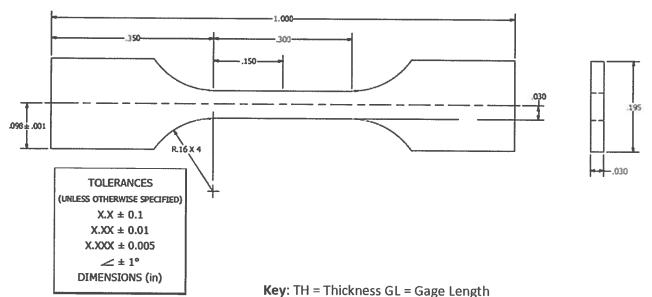
Instrument: Instrument: /-0000-1280 Inspector: 1-0000 - 7161 Cal Date: 5-24-17 Cal Date: 5-24-17 12 A.J.Z 18 Due Date: Due Date: 5-24-18 Date: 0-6" DIGITAL MIC OPTICAL comparation MITUTOYO ScHERR - Turnico

Zion SS3 Specimen



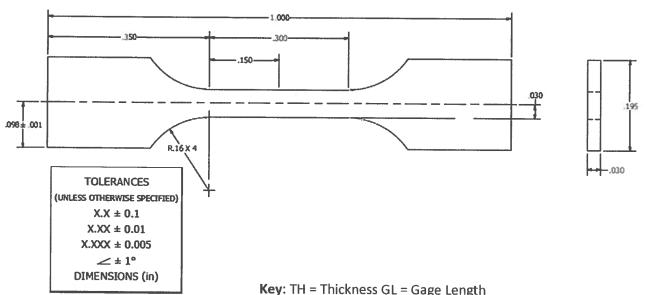
				NED DIMENS	<u> </u>			
SPECIMEN I.D.	"1.00"	"0.195"	"0.350"	"0.300"		.16"	GL "0.060"	TH "0.030"
		_			0.16	0.16		
F622 - 21	1.00	0.195	0.350	0.300	0,16	0.16	0.058	0.030
	,				0.16	0.16		
22	1.00	0.185	0.350	0.300	0.16	0.16	0.058	0.030
					0.16	0.16		4
73	1.00	0.195	0.350	d.300	0.16	0.16	0.058	0.030
	:				0.16	0.16		
२५	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0.030
					0.16	0.16		
52	1.00	0.195	0.350	0.300	0.14	0.16	0.058	0.030
					0.16	0.16		
24	1.00	0.145	0.350	0.300	0.16	0.16	0.058	0.030
					v. 16	0.16		
27	1.00	0.195	0.350	0.300	0.16	0.14	0.058	0,030
28	NOTE							
79	N							
							Ÿ.	
								,
			·					

Instrument: Inspector: Instrument: 1-0000 - 1280 1-0000-7161 Cal Date: 5-24-17 Cal Date: 5-24-17 Due Date: Due Date: Date: 12 A7218 5-2418 5-24-18 0-6" DIGITAL MIL OPTICAL COMPARATOIL SCHERR - TUMICO MITUTO-10



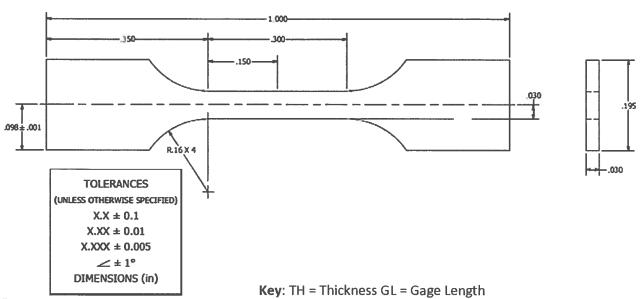
			45 144 SUU					
		T		NED DIMENS				
SPECIMEN I.D.	"1.00"	"0.195"	"0.350"	"0.300"	RC "RC).16"	GL "0.060"	TH "0.030"
					0.16	0.16		
FI01-11	1.00	0.195	0.350	0.300	0.14	0.16	0.058	0.030
			3 3,5		0.16	0.16		
13	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0.030
					0.14	0.16		
13	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0.030
·					0:16	0.16		
14	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0.030
					0.16	0.16		
15	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0.030
					0.16	0.16		
16	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0.030
1.5					0.16	0.16		
ا ا	1.00	0.195	0.350	0.300	0.14	0.16	0.058	0.030
					0.16	0.16		
18	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0.030
<u> </u>							7	

mITUTOYO SCHERR - TUNICO



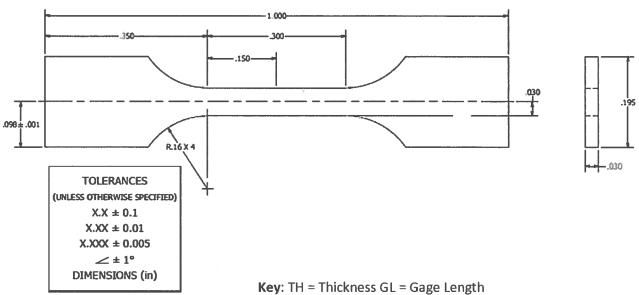
			y: IH = INICK	illess GL – Ga	ige Length			
			AS MACHI	NED DIMENS	SIONS			
SPECIMEN I.D.	"1.00"	"0.195"	"0.350"	"0.300"	"RO	0.16"	GL "0.060"	TH "0.030"
					0.16	0.16		
FI 22 - 21	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0.030
					0.14	0.16		
72	1.00	0.195	0.350	0.300	0.14	0.16	0.058	0.030
					0.16	0.16		
रु	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0.030
2.7				T T	0.16	0.16	_	
24	1.00	0.195	0.350	0.300	0.16	0.16	0.056	0.030
3		0.0			0.16	0.16		
52	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0.030
3.1	,		!		0.16	0.16	_	
26	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0.030
27	1.	0 -	2 -		0.16	0.16	_	
· ((.00	0.195	0.350	0.300	0.16	0.16	0.058	0.030
7 \	,		_		0.16	0.16		
58	1.00	0.195	0.350	0.300	0.6,	0.16	0.058	0030
							. I	
							_	
							. I	

Instrument:	1-000-7141	Instrument:	1-0000 - 1280	Inspector:	7. 36 Ti, choosy
Cal Date:	5-2417	Cal Date:	5-24-17		
Due Date:	5-24-18	Due Date:	5-24-18	Date:	1217218
	O-6" MITUTOYO		of TICA (confort	200	
	DIGITAL MIC		CAHERRIL - TUM.	Ca	



			AS MACHI	NED DIMENS	IONS	<u>.</u>		
SPECIMEN I.D.	"1.00"	"0.195"	"0.350"	"0.300"	"R(0.16"	GL "0.060"	TH "0.030"
FK01-11	1.00	0.195	0.350	0.300	0.16	0.16	0.05%	0.030
17	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0.030
13	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0.030
14	1.00	0.195	0.350	0.306	0.16	0.16	0.658	0.030
15	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0.030
16	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0.030
17	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0.030
18	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0.030
	П							

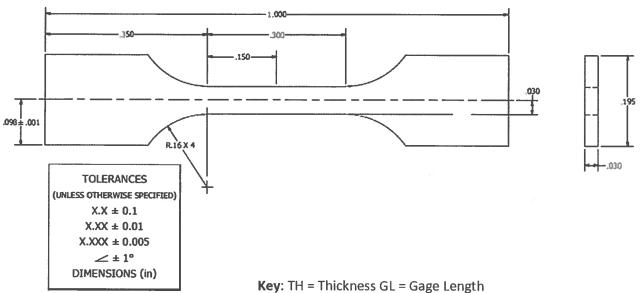
MITUTOYO SCHER2 - TUMICO



		Ke	y: IH = Inick	iness GL = Ga	ge Length			
			AS MACHI	NED DIMENS	IONS			
SPECIMEN I.D.	"1.00"	"0.195"	"0.350"	"0.300"	"R	0.16"	GL "0.060"	TH "0.030"
_					0.16	0.16		
FKZZ - ZI	1.00	0.195	0.350	0.300	0.14	0.14	6.658	0.030
					0.16	0.16		
रि	1.00	0.115	0.350	0. 300	0.16	0.16	0.058	0.030
					0.16	0.16		
13	1.0c	0.195	0.350	0.300	0.16	0.16	0.058	0.030
					0.16	0.16	_	10
كدر	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0.030
					0.16	0.16	_	9.
52	1.00	0.195	0.350	0.300	0.16	0.16	0.058	C.030
2/		100			0.16	0.16	- 45-66	
24	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0.030
25	1 1 1 .	010-	0.350	2 2	0./6	0.16	-	۵ ـ
77	1.00	0.195	0.330	0.300	0.16	0.16	0.058	2.030
2.0		0.195	0.350	0.200	0.16	0.16	0.058	
۶۶	1.00	0.173	0,330	0.300	0.16	0.14	0.038	0.030
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		1						
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						i	_L_	

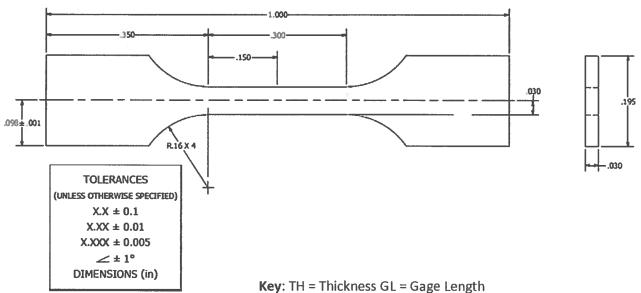
Instrument:		Instrument:		Inspector:	Dina Ticilan
Cal Date:	5-24-17	Cal Date:	5-24-17		7
Due Date:	5-24-18	Due Date:	5-24-18	Date:	12 APR14
	0-6" DIGITAL MIC	_	OPTICAL COMPARATOR		

MITUTOYO SCHERZ-TUMICO

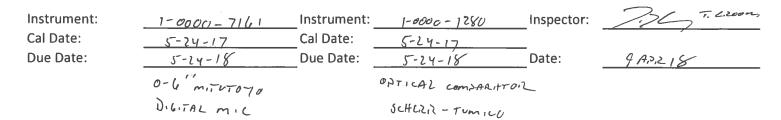


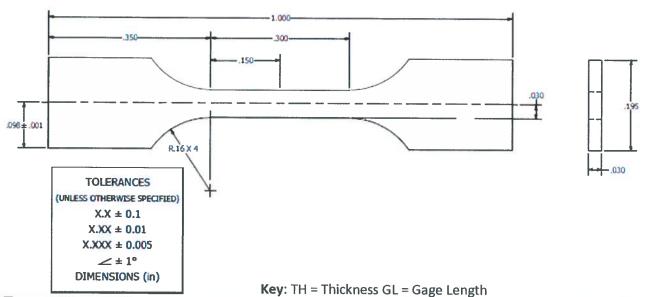
				NED DIMENS		*		
SPECIMEN I.D.	"1.00"	"0.195"	"0.350"	"0.300").16"	GL "0.060"	TH "0.030"
FM01-11	1.00	0.155	0.350	0.300	0.16	0.16	0.058	0.030
۱۷	1.00	0.185	0.350	0.300	0.16	0.16	0.058	0.030
13	1.00	0.195	0.350	0.300	0:16	0.16	0.058	0,130
14	1.00	0.195	0350	0.300	0.16	0.16	0.058	0.030
JS	1.00	0.195	0.350	o.300	0.16	0.16	0.058	0.030
14	1.00	0.195	0.350	0.3ac	0.16	0.16	0.058	0.030
17	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0.030
18	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0.030
							-	

Instrument:	1-0000 - 7161	_Instrument:	1-0000-1280	_Inspector:	Trent. cirove
Cal Date:	5-24-17	Cal Date:	5-24-17		•
Due Date:	5-24-18	Due Date:	5-24-18	Date:	9 AZZ 18
	O-6" DIGITAL MI	_ 0	PTICAL COMPARATOR	<	
	MITUTOYO	S	CHERR - Turnica		



		Ve	y. III - IIIICK	iless GL – Ga	ge rengtii			
			AS MACHI	NED DIMENS	IONS			
SPECIMEN I.D.	"1.00"	"0.195"	"0.350"	"0.300"	"RO).16"	GL "0.060"	TH "0.030"
					0.16	0.16		
FM 22 - 21	1.00	0.195	0.350	0.300	0.16	0.16	0.054	0.030
					0.16	0.16		
25	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0.030
					0.16	0.16		
73	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0.030
2				51	0.16	0.16	_	
24	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0.030
					0.16	0.16	_	
75	1.00	0.195	0.360	0.300	0.16	0.16	0.058	0.030
5.1					0.16	0.14	_	
74	1.00	0.195	0.350	0.300	0.14	0.16	0.05%	0.030
, ,					0.16	0.14	4	
27	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0.030
			. 2		0.16	0.16		
5,8	1.00	0.115	0.350	0.300	0.16	0.16	0.058	0.030
							-	
							-	
							4	
					*			

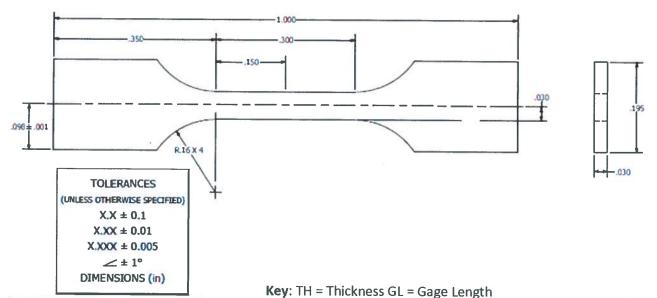




			y. III - IIIICK					
			AS MACHII	NED DIMENS	IONS			
SPECIMEN I.D.	"1.00"	"0.195"	"0.350"	"0.300"	"RO	.16"	GL "0.060"	TH "0.030"
					6.16	0.14		
FO 01 - 11	1.00	0.195	0.350	0.300	0.14	0.14	0.058	0.030
					0.16	0.16		
12	1.00	0.195	0.350	0,300	0.16	0.16	0.058	0.030
					0.14	0.16		
13	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0.030
11.	**				0.16	0.16		
14	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0.030
					0.16	0.16	_	
15	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0.030
					0.16	0.16		
14	1.00	0.145	0.350	0.300	0.16	0.16	0.058	0.036
					0.16	0.16	_	
17	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0.030
(4)		0.0-		_	0.16	0.16		
18	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0.030
							. 1	

Instrument:	1-0000-7161	Instrument:	1-0000 - 1780	Inspector:	7. 3CT T. encom
Cal Date:	5-24-17	Cal Date:	5-24-17		
Due Date:	5-24-18	Due Date:	5-24-18	Date:	9 AP12 18
	0-6" m, TUTO YO		EATICAL COMPAGE	LATOR	
	DIGITAL MIC		SCHIRZ - Turnel D		

Zion SS3 Specimen



			y. III - IIIICK		Se rengen			
			AS MACHI	NED DIMENS	IONS			
SPECIMEN I.D.	"1.00"	"0.195"	"0.350"	"0.300"	"RO	.16"	GL "0.060"	TH "0.030"
					0.16	0.16		
F022-21	1.00	0.195	0.350	0.300	0.14	0.16	0.058	0.036
					0.16	0.16		
27	1.00	0.195	0-350	0.300	0.16	0.16	0.058	6.030
					0.16	0.16		
53	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0.030
					0.16	0.16	·	
7.1	1.00	0.195	0.350	0.300	0.16	1.16	0.058	0.030
			!		0.16	0.16		
52	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0,036
37					0.16	0.16	_	
26	1.00	0.195	0.350	0.300	0.16	0.16	0.054	0.020
					0.16	0.16]	
27	1.00	0.195	0.350	0.300	0.16	0.16	0.658	0.030
5.1/	1				0.16	0.16]	
78	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0.030
k		1						
			ļ.					83

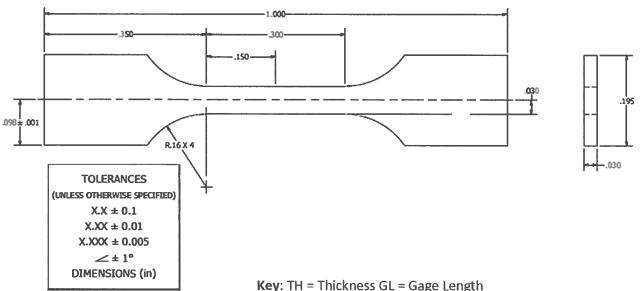
Instrument: 1-0000-7161 Instrument: 1-0000-1280 Inspector: 7.36 T. c.2007

Cal Date: 5-24-17 Cal Date: 5-24-17

Due Date: 5-24-18 Due Date: 5-24-18

OPTICAL companator

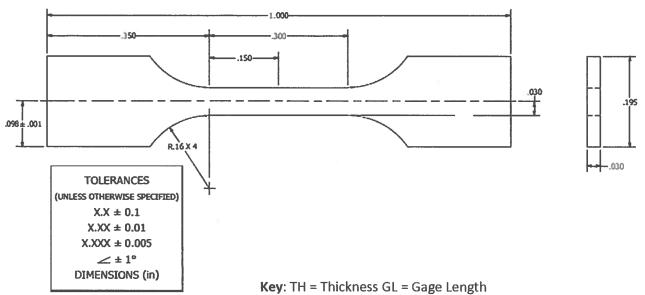
MITUTO10 SCHEZIZ -TUMICO



key. In - Illickness GL = Gage Length									
			AS MACHI	NED DIMENS	IONS				
SPECIMEN I.D.	"1.00"	"0.195"	"0.350"	"0.300"	"RC).16"	GL "0.060"	TH "0.030"	
					0.16	0.16			
Fa 01 - 11	1.00	0.195	0.350	0.300	6.16	0.16	0.056	0.030	
					0.16	0.16			
17	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0.030	
			:		0.16	0.16			
13	1.00	0.195	0.350	0.300	0.14	0.16	0.058	0.080	
					0.16	0.16		y)	
19	1.00	0.195	0.350	0.300	0.16	1.16	0.058	0-030	
					0.16	C.16			
15	1.00	0,195	0.350	0.300	0.16	0.16	0.058	0.030	
1.		0 —	_		0.16	0.16			
16	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0.030	
15	,				0.16	0.16			
17	1.00	0.195	0.350	0.300	0.16	0.16	0.05%	0.030	
11/			2		0.16	0.16			
18	1,00	0.195	0.350	0.300	0.16	0.16	0.058	0.030	
							_		
1							1		

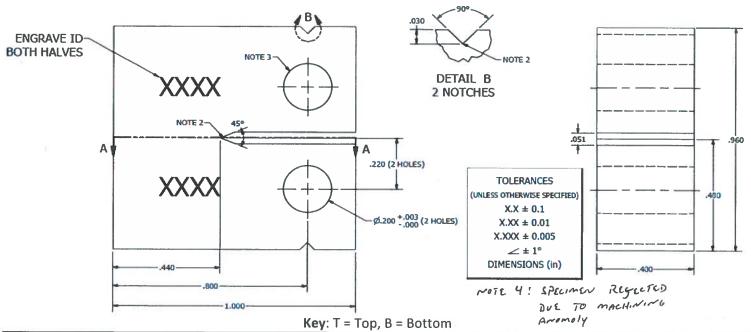
T. CIZON Instrument: 1-000C - 1780 Instrument: 1-0000-7161 Inspector: 5-24-17 Cal Date: 5-24-17 Cal Date: 9A7218 Due Date: Due Date: 5-24-18 Date: 0-6" DIGITAL MIC OPTICAL COMPARATOR

MITUTO 10 SCHELLE - Tumico



			AS MACHII	NED DIMENS	IONS			
SPECIMEN I.D.	"1.00"	"0.195"	"0.350"	"0.300"	"RC).16"	GL "0.060"	TH "0.030"
Fa22 - 21	1:00	0.195	0.350	0.300	0.16	0.16	6.05%	0.030
22	1.00	0.145	0.350	0.300	0.16	0.16	0.058	0.030
27	1.00	0.145	0.350	0.300	0.16	0.16	0.058	ø.03U
Syl	1.00	0.145	0.350	0.300	0.16	0.16	0.058	0.030
15	1.00	0.115	0.350	0.300	0.16	0.16	0.058	0.030
26	1.00	0.195	0.350	0.300	0.16 0-1b	0.16	0.058	0.030
77	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0.030
28	1.00	0.195	0.350	0.300	0.16	0.16	0.058	0.030
							}	

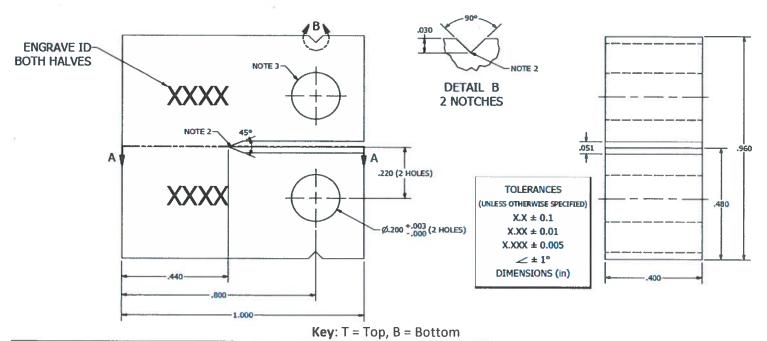
Instrument:	1-0000-716.1	Instrument:	1-0000-1280	Inspector:	Ticizoon
Cal Date:	5-24-17	Cal Date:	5-24-17		
Due Date:	5-24-18	Due Date:	5-24-18	Date:	JAPRIK
	0-6"m.TUTOMO		OPTICAL COMPALA	TUZ	
	DIGITALMIL		ScHCZZ - Tumica	v	



	AS MACHINED DIMENSIONS											
SPECIMEN I.D.	"1.000"	"0.960"	"0.800"	"0.440"	"45.0°"	"0.030"	"90.0°"	"0.220"	"0.200"	"0.400"	"0.480"	"0.051"
						6.028	90.00	Torro	T 0.200			
FB-01	1.003	0,961	0.799	0.445	45.0	0.028			B 0. 200	0.402	0.475	6.050
						0.028	90.00	I	T 0.200			
02	1.003	0.961	0.799	0.443	45.0	0.028	90.00	B 0,220	B 0.200	0.401	0.480	0.050
	NOTE 4							T	Т /			
03	100							В	В/			
	·				11 0	0.028	90.00	T 0.220	T 6.203			
04	1.003	0.961	0.799	0,442	45,0	0.028			B 0.203	0.402	0.475	0.050
			0.4		1. "	0.028		T 0.220				
92	1.002	0.960	0.794	0,442	45.00	0.028			B 0,202	0.401	0.480	0.050
						0.026		T 0.220	T 0.203			
06	1.001	0.961	0.799	0.442	45.0	0.028			B 0.203	0,401	0.480	0.050
		0 -				0.028		T 0.220	T 6.203			
٢٥	1.001	0,960	0.799	0.442	45.0	0.028			B 0,203	0.401	0.480	0.050
		_ ,				0.028		T 0.220				
80	1.001	0.940	0.799	0.442	45.00	0.028	-	B 0.220		0.402	0.480	0.050
0.0						0.028	90.00	T 0,220	Τ σ.τοι			
09	1.000	0.960	0.799	0.442	45.0	0.028			B 0.202	0.401	0.480	0,050
			200	. 1///2	45.0	0.028		T0,220	T 0. 202			
10	1.001	0.961	0.799	0.442	13.0	0.028	90.00	B 0.220	B 0,202	0.400	0.480	0.050

Instrument	1-0000-7161	_Instrument:	1-0000 - 1280	Inspector:	775 T. Cram
Cal Date:	5-24-17	_Cal Date:	5-24-17	_	
Due Date:	5-24-18	_Due Date:	5-24-18	_Date: _	24 A1212 18
	0-6" DIGITAL MIC		OPTICAL COMPARATOR	`	
	MITUTO-10		SCHERR - TUMICO		

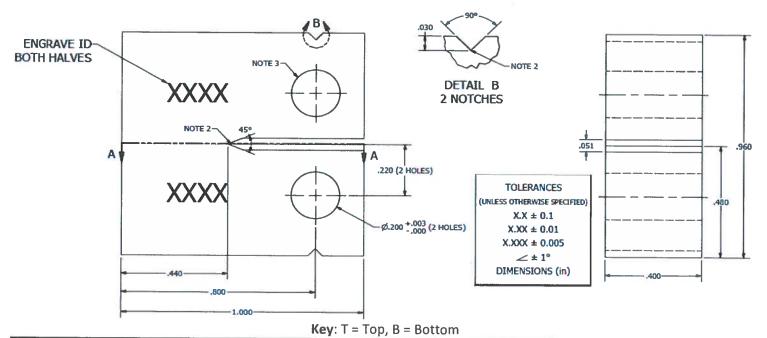
Zion 0.4 C(T) Specimen



AS MACHINED DIMENSIONS "45.0°" "0.030" "90.0°" "1.000" "0.960" "0.800" "0.440" "0.051" SPECIMEN I.D. "0.220" "0.200" "0.400" "0.480" 80.00 T 0.220 T 0,202 0.028 FD - 01 0.961 0.800 0.442 45.0 90.00 1.003 0.028 B 0.220 B 0.202 0.401 0.480 0.050 90.0° T 0.220 T 0.202 0.028 45.0 0.442 90.00 B 0.220 02 1.001 0.960 0.800 0.028 B 0.202 0.402 0,480 0.050 90.00 T 0.220 T 0.202 0.028 0,961 03 0.800 0.442 45.0 90.00 0.402 1.001 850.0 B 0.220 B 0.202 0.480 0.050 90.00 T 0.220 0.028 T 0.207 90.00 04 1.001 0.960 B 0.202 0.402 0.800 0.442 45.0 0.028 B 0.220 0.480 0.050 90.00 T 0.220 T 0.202 0.028 0.961 90,00 0.401 05 1.001 0.800 0.442 45.0 B 0.220 B o.zoz 0.028 0.480 6.050 90.0° T 0.220 T 0,202 0.028 0,960 0,480 06 1.001 0.800 0.442 45.0 90.0' B 0.220 B 0.203 0.028 0.401 0.050 90.0° T 0.220 0.028 T 0.20Z 07 0.960 1.000 0.800 0.442 45,0 0.028 90.00 B 0.220 B 0.202 0.402 0.480 0.050 90.00 T 0.220 0.028 505.0 T 08 0.960 90.00 B 0.220 1.000 0.800 0.442 45.0 0.401 0.028 B 0.202 0.480 0.050 T 0.220 T 0.202 90.00 0.028 09 0.961 45.0 90.0 B 0.220 B 0.202 1.001 0.800 0.442 0.028 0.402 0.480 0.050 90.00 T 0.220 0.028 10 0.800 0.961 45.0 0.442 1.001 90.00 B 0.220 B 0,400 0.480 0.050 0.028

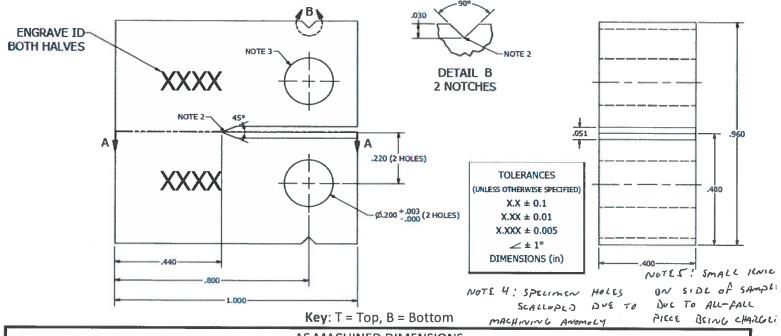
Instrument	: 1-0000-7141	Instrument:	1-0000-1280	_Inspector <u>:</u>	7.75 T. Croon
Cal Date:	5-24-17	Cal Date:	5-24-17	_	
Due Date:	5-24-18	Due Date:	5-24-18	_Date:	24971218
	0-6" DIGITAL MIL		OPTICAL COMPARATOR		
	MITUTOYO		SCHEZIZ - Tunico		

Zion 0.4 C(T) Specimen



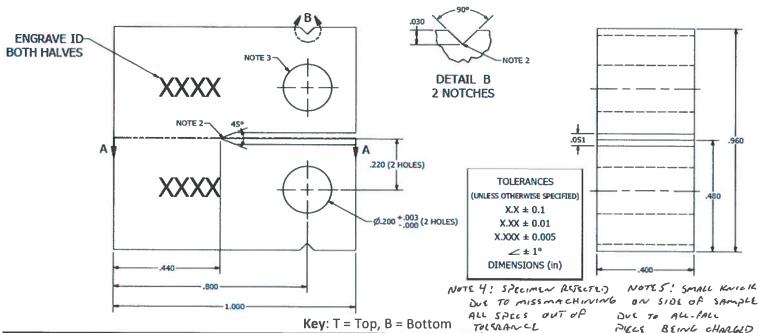
				AS	MACHIN	IED DIMI	NSIONS					
SPECIMEN I.D.	"1.000"	"0.960"	"0.800"	"0.440"	"45.0°"	"0.030"	"90.0°"	"0.220"	"0.200"	"0.400"	"0.480"	"0.051"
l _						0.028	90.0	T 0.220	T 0.203			
FF - 01	1.002	0.960	0.800	0.442	45.0	0.018	90.0	B 0,200	B 0, 203	0.400	0.480	0.050
						0.028	90.0°	T 0.220	T0.203			
०८	1.001	0.960	0.800	0.442	45.0	0.028	90.00	B 0.270	B 0.203	0.400	0.480	0.050
					,	0.028	90.00	T 0.220	T0.203			
03	1.002	0.961	0.800	0.442	45.0	0.028	90.0"	B 0,270	B 0.203	0.401	0.480	0,050
		_				0.028	90.00	T 0.220	T 0.202			
04	1.002	0,941	0,800	0.442	45,0	0.028	90.00	B 0.220	B 0.202	0.401	0.480	0.050
						0.028	90.0	T 0.220	T 0.203			
05	1.001	0.961	0.800	0.442	45.0	0.028	90.00	B 0.220	B 0.203	0.401	0.480	0.050
					_	0.025	90.00	T 0.220	T 0.203			
06	1.001	0.941	0.800	0.442	45.0	0.028	90.00	B 0.220	B 0.203	0.900	0.480	0.050
0=						0.028	90.0'	T 0.220	T 0. 702			
٦٥ -	1.001	0,960	0,800	0,447	45.0	0,024		B 0.220	B 0.202	0.400	0.480	0.050
011					4.	0.028	90.0	T 0.20	T 0.202			
08	1.001	0,960	0.800	0.442	45.0	0.028	90.0	B 0,220	B 0.202	0.400	0.480	0.050
70	4.				4-	0.028		T 0.226	T 0.202	,		
09	1.001	0.961	0.800	0.442	45.0	0.018			B 0.202	0.400	0.480	0.050
10	1 0	- 01 .	_		4	0.028		T 0.220	T 0.202			
10	1.001	0.941	0.800	0.442	45.0	0.028	90.0	B 0.220	B 0.202	0.400	0.480	0.050

Instrument:	1-0000-7161	Instrument:	1-0000-1280	_Inspector	: De Ticizoon
Cal Date:	5-24-17	Cal Date:	5-24-17	_	
Due Date:	5-24-18	Due Date:	5-74-18	_Date:	24 APR 18
	0-6" DIGITAL MIC		OFTICAL COMPARATOR		
	MITUTO YO		SCHEZZ - Turnica		



				- 1	Cy. 1 - 1	υp, b – b	ottom	MACHI	NING AND	moly	Lires	BEING CHA
				AS		IED DIME	NSIONS		3,000			
SPECIMEN I.D.	"1.000"	"0.960"	"0.800"	"0.440"	"45.0°"	"0.030"	"90.0°"	"0.220"	"0.200"	"0.400"	"0.480"	"0.051"
						0.028	90.0	T 0.26	T 0.203			
FH - 01	1.000	0.961	0.800	0.442	45.0	0.028	90.0'	B 0.220	B 6,203	0.401	0.480	0.050
						0.028	90.0	T 0.220	T 0,203			
०२	1.001	0.960	0.800	0.442	45.0	0.028	90.0'	B 0.220	B 0.203	0.401	0.480	0.050
					U	0.028	90.00	T 0.220	T AIL'I] .		
03	1.001	0.961	0.800	0.442	45.0	0.028	7	B 0.220	В	0.401	0.480	0.050
						0.028	90.0	T 0-720	T 0.207			
04	1.001	0.960	0.800	0.442	45.0	0.028	90.0	B 0.220	B 0.202	0.401	0.480	0.050
NOTE S						0128	90.0	T 0.220	T 0.202			
05	1.000	0.961	0.800	0.442	45.0	0.028	90.00	B 0.220	B 0.202	0.401	0.480	0.050
_						0.028	90.00	T 0.220	T 0.203			
06	1.000	0.961	0.800	0.442	45.0	0.028	90.00	B 0.220	B 0.203	0.401	0.480	0.050
						028	90.00	T 0.220	T 0,203			
7 07	1.001	0,961	0.800	0.442	45.0	0.028	90.0	B 0.220	B 0.203	0.400	0.480	0.050
						0.028	90.00	Τ ο. ιιο	T 0.203			
08	1.000	0.960	0.800	0.442	45.0	0.028	90.00	B 0.220	B 0.205	0.400	0.480	0.080
						0.028	80.0	T 0.220	T 0.703			
09	1.001	0.961	0.800	0.442	45.0	0.028	90.00	B 0.220	B 0.203	0.401	0.480	0.00
						0.025	90.00	T 0.220	T 0,202			
10	1.001	0.961	0.800	0.442	45.0	0.028	90.00	B 0.220	B 0.202	0.401	0.480	0.050

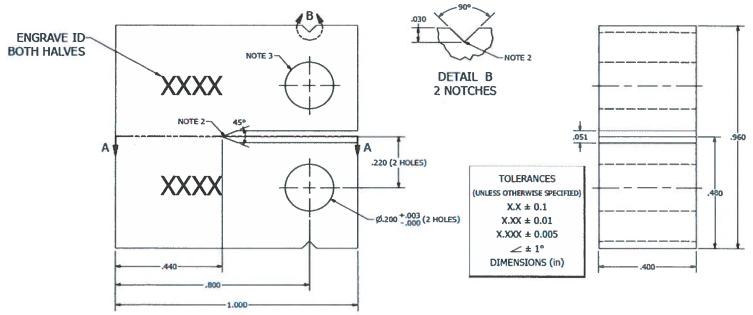
nstrument:	1-0000 - 7141	_Instrument:	1-0000-1280	_Inspector:	7767.62000	~
Cal Date:	5-24-17	_Cal Date:	5-24-17	_		
Due Date:	5-24-18	_Due Date:	5-24-18	_Date:	24 AAR 18	
	O-6" DIGITAL MIC		OPTICAL COMPARATOR			
	MITUTOYO		SCHEZZ - Tumico			



AS MACHINED DIMENSIONS "45.0°" "1.000" "0.440" "90.0°" "0.960" "0.800" "0.030" SPECIMEN I.D. "0.220" "0.200" "0.400" "0.480" "0.051" T 0.270 0.028 90.0 T 0.203 FJ-01 1.002 0.960 0.800 0.442 45.0 0.028 90.0 B 0.220 B 0.203 6.402 0.480 0.050 90.00 T 0.220 0.028 T 0.703 0.442 45.0 0.960 0.800 90.0 07 1.001 0.028 B 0,220 B 0.23 0.402 0.480 0.050 T 0.202 0.028 90.0 T 0.220 45.0 90.00 03 1.001 0.461 0.442 0.800 0.028 B 0,220 B 0.202 0.402 0.480 0.050 0.028 T 0.220 T0.202 90.0 45.0 1.001 0.800 B 0.220 B 0.202 04 0.961 0.402 0.447 0.028 90.0 0.480 0.050 05 90.00 T 0.220 0.028 T 0.203 1.000 0.960 06 0.800 45.0 0.442 90.0 B 0.220 B 0.203 0.402 0.480 0.050 6.028 MUTE 0.028 90.0 T 0.20 T 0.202 07 0.960 B cizzo 0.402 1.001 0.800 0.442 45.0 0.028 90.00 B 0.202 0.480 0.050 90.0 T 0.220 0.028 T 0.203 08 0.961 1.001 0.800 0.442 45.0 B 0.20 0.401 0.050 0.028 90.00 B 0.203 0.480 T 0.220 90.0 T 0.203 0.028 09 1.001 0.961 45.0 90.00 B 0.220 0.402 0.050 0.800 0.442 0.480 0.028 B 0.202 90.0 T 0.220 0.028 T 0.203 10 0.800 0.442 0.407 0.961 45.0 .001 90.00 B 0.220 B 0.20) 0.480 0.028 0,050

	MITUTOYO					
	DIGITAL MIC		SCHERR - TUMICC			
	O-6" ATTICAL COAPITE		UPTICAL COMPARATOR	~		
Due Date:	5-24-18	_Due Date:	5-24-18	_Date:	24 1272 18	
Cal Date:	5-24-17	_Cal Date:	5-24-17	_		
Instrument	1-0000-7161	_Instrument:	1-0000-1280	Inspector	7.70	7. 6,2 2007

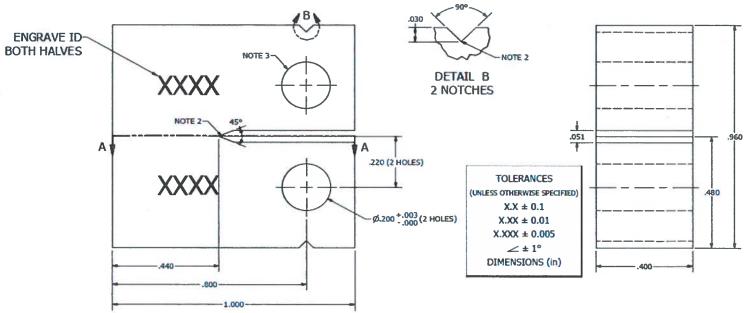
Zion 0.4 C(T) Specimen



Key: T = Top, B = Bottom

	AS MACHINED DIMENSIONS											
SPECIMEN I.D.	"1.000"	"0.960"	"0.800"	"0.440"	"45.0°"	"0.030"	"90.0°"	"0.220"	"0.200"	"0.400"	"0.480"	"0.051"
						0.028	90.0	T 0.220	T 0.202			
FL- 01	1.001	0.961	0.800	0.442	45.0	0.028	90.0	B 0,220	B 0.202	0.401	0.480	0.050
						0.028	90.00	T 0.220	T 0.203			
०२	1.001	0.961	0.800	0.442	45.0	0.028	90.0"	B 0.220	B 0.203	0.400	0.480	0.050
						0.028	90.00	T 0.220	T 0.203			
03	1.001	0,961	0.800	0.442	45.0	0.028	. 90.0"	B 0.220	B 0.203	0.400	0.480	0.050
		•				0.028	90.00	T 0.220	T 0. 203			
04	1.001	0.960	0.800	0.442	45.0	0.028	90.0"	B 0.220	B 0.203	0.400	0.480	0.050
						0.028	90.00	T 0.220	T 0.703			
05	1.001	0.960	0.800	0.442	45.0	0.028	90.0	B 0.22	B 0.203	0.400	0.480	0.050
						0.028	90.00	Τ σ.νο	T 0.203			
06	1.601	0.961	0.800	0.442	45.0	0.028	90.00	B 0.220	B 0.703	0.400	0.480	0.050
						0.028	90.0	T 0.20	T 0.203			
70	1.001	0.960	0.800	0.442	45.0	0.028	90.0'	B 0.270	B 0.205	0.400	0.480	0.050
	_					0.028	90.00	T 0.220	T0.203		·	
08	0.995	0.961	0.800	0.442	.45.0	0.028	90.0	B 0.270	B 0.203	0.400	0.480	0.050
					4.	0.028	90.0	Τ 0.220	T 0.203			\
09	1,001	0.961	0.800	0.442	45.0	0.028	90.00	B 0.220	B 0.203	0.400	0.480	0.050
						0.028	90.0	T 0.220	T0.203			
10	1.001	0.961	0.800	0.442	45.0	0.018	90.0	B 0.220	B 0.203	0.400	0.480	0.050

Instrumen	t: <u>1-0000-7161</u>	Instrument:	1-0000-1280	Inspecto	r: 7. 7. 6.2000	~~
Cal Date:	5-24-17	Cal Date:	5-24-17			
						
Due Date:	5-24-18	Due Date:	5-24-18	Date:	24 APR 18	
	0-6" DIGITAL MIC		OFTICAL compARTIE	^		
	MITUTOYO		Schezz - Tumico			

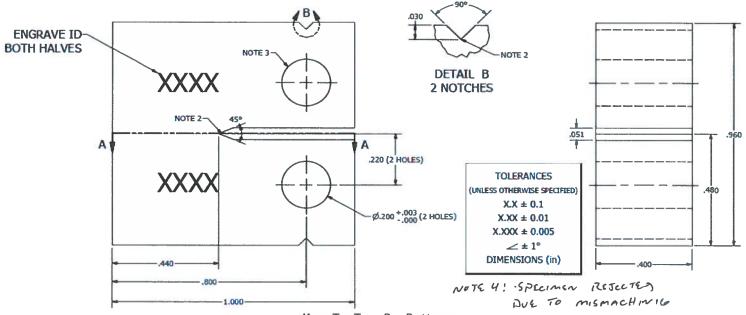


Key: T = Top, B = Bottom

				AS	MACHIN	ED DIME	NSIONS					
SPECIMEN I.D.	"1.000"	"0.960"	"0.800"	"0.440"	"45.0°"	"0.030"	"90.0°"	"0.220"	"0.200"	"0.400"	"0.480"	"0.051"
						0.028	90.0	T 0.220	T 0.203			
FN - 01	1.001	0.961	0.800	0.442	45.0	0.028	90.0	B 0.20	B 0.207	0.400	0.480	0.050
						0.028	90.0	T 0.20	T 0.203			
०२	1.001	0,961	0.800	0.442	45.0	0.028	90.0	B 0.220	B 0.203	0.400	0.480	0.050
						0.028	90.0	T 0.220	T 0.203			
υζ	1.001	0.961	0.800	0.442	45.0	0.028	90.0	B 0.220	B 0,203	0.400	0.480	0.050
						0.028	90.0	T 0.220	Τ ω. τος			
04	1.001	0,961	0.800	0.442	45,0	0.028	90.0	B 0.220	B 0.203	0.400	0.480	0.050
						0.028	90.0	T 0,220	T 0.203			
05	1.001	0.961	0.800	0,442	45.0	0.028	90.0	B 0.220	B 0,203	0.400	0.480	0.050
		ĺ				0.028	80.0	T 0.220	T 0.203			
06	1.001	0.961	0.800	0.442	45,0	0.028	90.0	B 0.220	B 0.207	0.400	0.480	0.050
	!					0.28	40.0	T 0.720	T 0.207		_	
07	1.001	0.961	0.800	0.442	45.0	0.028	40.0	B 0.220	B 0,203	0.400	0-480	0.050
						0.028	90.0	T 0.226	T 0.203			
08	1.000	0,961	0.800	0.442	45.0	0.028	90.0	B 0,220	B 0.203	0.401	0.480	0.050
						0.048	90.0	T 0.220	T 0.203			
09	1.001	0,960	0.800	0.442	45,0	0.028	90.0	B 4.26	B 0.203	0.401	0.480	0.050
						0.028	90.0	T 0.220	T 0.203			
10	1.001	0,940	0.800	0.442	45.0	0.028	90.0	B 0.220	B 0.203	0.402	0.480	0.050

Instrument	1-0000-7161	Instrument:	1-0000-128	_ Inspector	: 7.34, 1.	Cloon
Cal Date:	5-24-17	Cal Date:	5-24-17	_		
Due Date:	5-24-18	Due Date:	5-24-18	_Date:	2447218	
	O-G" DIGITAL MIC		OPTICAL COMPARATION			
	MITUTOY O		SCHERR-TUMICO			

Zion 0.4 C(T) Specimen



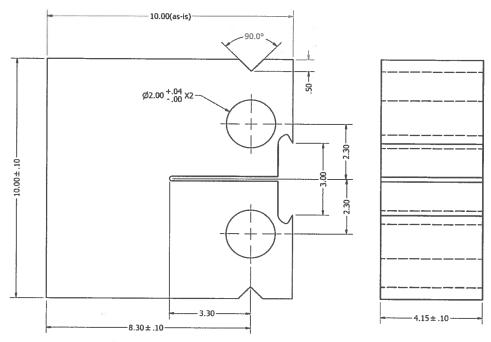
Key: T = Top, B = Bottom

	AS MACHINED DIMENSIONS												
SPECIMEN I.D.	"1.000"	"0.960"	"0.800"	"0.440"	"45.0°"	"0.030"	"90.0°"	"0.220"	"0.200"	"0.400"	"0.480"	"0.051"	
						0.028	80.0	T 6.220	T 0.203				
FP-01	1.001	0.961	0,800	0.442	45.0	0.028	90.0	B 0.220	B 0.203	0.405	0.480	6.050	
						0.028	90.0	T 0.220	T 0.203				
02	1.001	0,961	0.800	0.442	45.0	0.028	90.0	B 0.220	B 0.203	0.404	0.480	0.050	
						0.028	90.0	T 0.226	T 0.203				
03	1.001	0,961	0,800	0.442	45.0	0.028	90.0	B 0.220	B 0.203	0.403	0.480	0.050	
5					110	850.0	90.0	T 0.220	T 0.207			·	
04	1.001	0.961	0.800	0.442	45.0	0.028	90.0	B 0.220	B 0.207	0.402	0.480	0.050	
						0.028	90.0	T 0.220	T 0.203				
05	1.001	0,961	0.800	0.442	45.0	0.028	90.0	B 0,250	B0,20)	0.400	0.480	0.050	
					,	0.028	90.0	T 0.220	T0.263				
06	1.001	0.961	0.800	0.442	45.0	0.028	90.0	B 0.220	B 0.263	0.400	0.480	0.050	
						0.028	90.0	T 0.220	T 0.203				
07	1.001	0.961	0.800	0.442	45.0	0.024	90.0	B 0.220	B .203	0.400	0.480	0.050	
						0.028	90.0	T 0.220	T 0.203	,			
08	1,001	0,961	0.800	0.442	45.0	0.028	90.0	B 0.220	B 0.203	0.400	0.480	0.050	
09	Notey							T B	В				
		-				0.028	90.0	Torre	T 0.203				
10	1.001	0.961	0.800	0.442	45.0	0.028			B 0.203	0.400	0.480	0.050	

Instrument:	1-0000-7161	_Instrument:	1-0000-1280	_Inspector	: 7.3 - T.C. ZOON
Cal Date:	5-24-17	_Cal Date:	5-24-17	_	
Due Date:	5-24-18	_ Due Date:	5-24-18	_Date:	24APR18
	0-6" DIGITAL MIC		OPTICAL COMPARATOIL	~	
	MITUTONO		SCHERR - Tumica		

Miniature Compact Tension Specimens Block CF Block F4

Block F3



ALL DIMENSIONS ARE IN (mm)
ALL TOLERANCES ARE ±0.04 (mm) UNLESS OTHERWISE NOTED

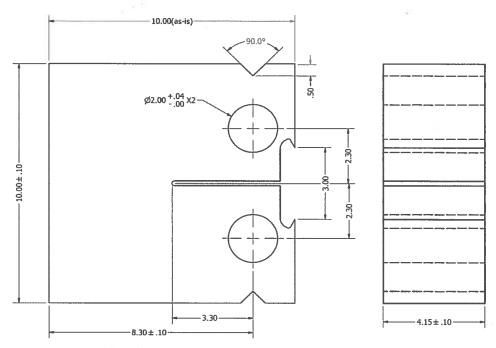
Key: T = Top, B = Bottom, GL = Gage Length

			. тор, в		L - Gabe Lei	.0				
	<u></u>			AS MACHI	NED DIMEN	ISIONS				
SPECIMEN I.D.	"10.00"	"10.00(as-is)"	"8.30"	"3.30"	GL "3.00"	"2.30"	"2.00"	"4.15"	"0.50"	"90.0°"
						T 7.30	T 2.00		0.50	90.00
FA01-1	10.07	10.04	8.30	3.34	3.04	B 2.30	B 7.00	4.15	0.50	90.00
						T 2-30	T 2.00		0.50	90.0
ζ	10.00	10.01	8.30	3.30	3.04	B 2.30	B 2.00	4.15	0.50	90.00
3						T 2.3,	T 7.00		1.50	90.00
3	10.01	10.00	8.30	3.30	3.04	B 2.30	B 7.00	4.15	0.50	90.00
			_			T 7.30	T 2-00	,	0.50	80.0°
FAOZ-1	10.00	9.92	8.24	3.30	3.04	B 2-30	B 2.00	4.15	0.50	90.00
		_	_			T 7-30	T 2.00	,	6.50	40.00
7	10.00	9.92	8.26	3.30	3.04	B 2.30	B 2.00	4.15	1.50	90.00
						T 2.30	T 2.00	,	0.50	90.00
3	10.00	9.92	8.26	3.30	3.04	B 2-30	B 2.00	4.15	0.50	90.0
			F .		_	T 7.36	T 2.00		0.50	90.00
4	10.00	9.97	8.26	3.30	3.04	B 2.30	B 7.00	4.15	0.50	90.00
 			ii.			T 2.30	T 2.00		6.50	90.0
FA 09 - 1	10.01	10.01	8.30	3.30	3.04	B 2.30	В 2.00	4.15	0.50	90.00
			6.3		. .	T 5.30	T 2.00	1.	0.50	90.00
٦	10.01	10.01	8.30	3.30	3.04	B 2.30	B 2.00	4.5	0.50	90.00

nstrument: <u>1-0000 - 7161</u>	Instrument: 1-0000-1280	Inspector: 234 7.000
		· · · · · · · · · · · · · · · · · · ·

Due Date: 5-24-18 Due Date: 5-24-18 Date: 20APR 18

MITUTOYO SCHERR - TUNICO



ALL DIMENSIONS ARE IN (mm) ALL TOLERANCES ARE ±0.04 (mm) UNLESS OTHERWISE NOTED

Key: T = Top, B = Bottom, GL = Gage Length

			1 100,0			0				
				AS MACHI	NED DIMEN	ISIONS				
SPECIMEN I.D.	"10.00"	"10.00(as-is)"	"8.30"	"3.30"	GL "3.00"	"2.30"	"2.00"	"4.15"	"0.50"	"90.0°"
						T 2.31	T 2.00		0.48	90.0
HA1-1	10.00	9.97	8.30	3.30	3.04	B 7.31	B 7.00	4.07	0.48	90.0"
l		11				T 2,31	T 2.00		0.48	90.00
ζ	9.98	10.01	8.30	3.30	3.02	B 5.31	B 2.00	4.08	0.48	90.00
						T 7.31	T 2.00	4	0.48	90.00
3	9.98	9.98	8.30	3.30	3.04	B 2.31	B 2.00	4.09	0.48	90,00
	0.01/	0.00				T 2.31	T 2.00		0.48	90,00
4	9.98	9.99	8.30	3.30	3,04	B 2.31	B 7.00	4.09	0.48	90.0
	0.00	0.00				15.5 T	T 2.00		0.48	90.0
5	9,98	9.99	8,30	3.30	3.04	B 2,31	B 2.00	4.08	0.48	90.00
7	0.0.4			_		T 7,31	T 2.00		0,48	40.0°
6	9.98	7.98	8.30	3.30	3.04	B 2.31	B 2,00	4.13	0.48	90.0
_			_			T 2.31	T 7.00		0,48	90.00
	10.02	10.01	8.30	3.30	3.04	B 731	В 2,00	4.10	0.48	90.00
(1)						15.5 T	T 2.00		0.48	90.0
8	10.02	10.00	8,30	3.30	3.04	B 7.31	B 2.00	4.10	0,48	90.00
		0.00				T 2.31	T 2.80	, ,	0.48	90.00
4	9.98	9.98	8.30	3:30	3.04	B 2.31	B 2.00	4.10	0.48	90.00

Instrument: 1-1240 - 0000

Instrument: 1-0000 ~ 7161

Inspector:

Cal Date: 5-24-17

Cal Date: 5-24-17

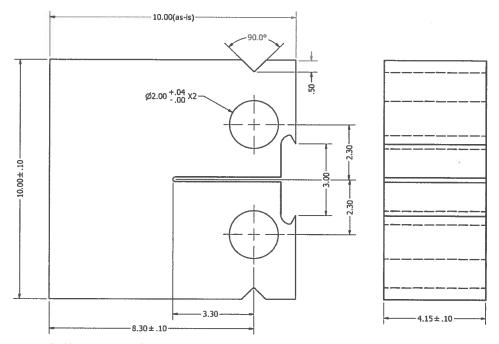
708617 Date:

Due Date: 5-24-18

OPTICAL COMPARATOR DIGITAL OUT/NSIDE MIC

SCHERR-TUMICO

O-6 MITUTO 10



ALL DIMENSIONS ARE IN (mm) ALL TOLERANCES ARE ±0.04 (mm) UNLESS OTHERWISE NOTED

Key: T = Top, B = Bottom, GL = Gage Length

			1 100,0		<u> </u>	0-				
				AS MACHI	NED DIMEN	ISIONS				
SPECIMEN I.D.	"10.00"	"10.00(as-is)"	"8.30"	"3.30"	GL "3.00"	"2.30"	"2.00"	"4.15"	"0.50"	"90.0°"
						T 230	T 2.00		0.48	90.00
401-1	10.00	10:01	8.30	3.30	3.04	B 2.30	B 2,00	4.13	0.48	90.00
	1 1			2	3	T 2.30	T 7.00		0.48	90.00
7	9,98	10.00	8.30	3.30	3.04	B 2.36	B 2.00	4.11	0.48	90.00
	a 1					T 7.30	T 2.00		0.48	90.00
3	9.98	10.01	8.30	3.30	3.04	B 2.30	B 2.00	4.11	0.48	90.00
	0.6.4					T 2.30	T 2.00		0.48	90.00
Ч	9.48	10.01	8,30	3-30	3.04	B 2.30	B 2.00	4.11	0.48	90.0
(-	4 40					T 2.30	T 2.00		0.48	90,00
5	4.99	10.07	8.30	3.30	3,04	B 2.30	B 7.00	4,11	0.48	90.00
,	1160			_		T 7.30	T 7.00		0.48	90.00
6	10.01	10.02	8.30	3.30	3.04	B 2.30	B 7.00	4.11	0.48	90.0
						T 2.30	T 2.00	1.	0.48	90.00
7	10.00	10.00	8.30	3.30	3.04	B 2.30	B 2.00	4. 11	0,48	90.00
	0			_	_	T 2.30	T 2.00	_	0.48	90.00
8	9.90	10,01	8.30	3.30	3.04	B 2.30	B 2.00	4.11	0.48	80.0°
_ ;			64.4	2.5		T 2.30	T 2.00	,	0.48	940"
9	10.00	10.00	8.30	3.30	3.04	B 2.30	B 2.00	4.10	0.48	90.0

Instrument: 1-1280-0000

Instrument: 1-0000-7161

Inspector: 234

Cal Date: 5-24-17

Cal Date: 5-24-17

Date:

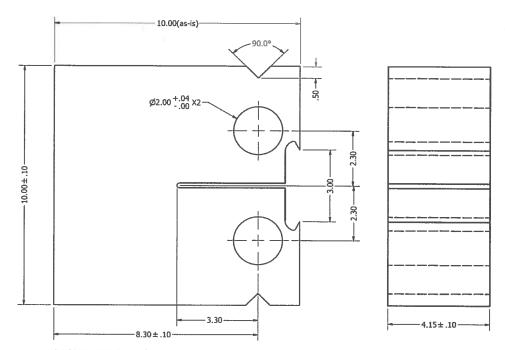
140817

Due Date: 5-24-18
OPTICAL COMPARATOR

GCHEAR - Tunico

Due Date: 5-24-18
DIGITAL OUT /INSIDE MIL

0-6 MITUTO70



ALL DIMENSIONS ARE IN (mm)
ALL TOLERANCES ARE ±0.04 (mm) UNLESS OTHERWISE NOTED

ACTUAL MEASUR-ENT - 4.0

		Кеу:	T = Top, B	= Bottom, G	L = Gage Lei	ngth		ACT	IAL MEASUR	- ENT-
				AS MACH	INED DIMEN	ISIONS				
SPECIMEN I.D.	"10.00"	"10.00(as-is)"	"8.30"	"3.30"	GL "3.00"	"2.30"	"2.00"	"4.15"	"0.50"	"90.0°"
ه، ۱ ۸۷۰	0.00	1.0:	4 4	2	<u> </u>	T 2.3D	T 2.00	1.5	0.48	90.00
4A1-10	9,98	9.98	8.30	3,30	3.04	B 2.30	B 2.00	4.10	0.44	90,00
7112:						T 230	T 2.00	Te *	0.48	90.0
3K2C-1	4.18	10.01	8.30	3.30	3.04	B 7.30	B 2.00	4.03	0.48	9000
	0 4 6		r			T 2.3 D	T 2.00	, TC A	0.48	90.00
,Σ	9.18	9,94	_8.30_	3.30	3.04	B 2.30	B 7.00	41.03	0,49	90.00
	0 00		f., .	3 %	2	T 2.30	T 2.00	,Te \$	0.48	90.00
3	9.99	10.01	8.30	3.30	3.04	B 2-30	B 2.00	4.03	9.48	90.0
						T 7.30	T 2.00	TCA	0.48	90.00
3K2A-1	i0.00	10.00	8.30	3.30	3,04	B 2.30	B 2.00	4.03	0.48	10.00
			0.5	2 2		T 2.30	T 2.00	, TOA	0.48	90.0
2	10.00	10.00	8.30	3.30	3.04	B 2.30	B 7.00	4.03	0.48	90,00
2			6.3	2 2		J 5.30	T 2.00	412	0.48	90,00
3	10.00	10.00	8.30	3.30	3.04	B 2.30	B 2.00	4.03	0.118	90.00
						Т	Т			
						В	В	1.13		
				,		Τ	T	(د .		
						В	В			

Instrument: 1-1280-0000

Instrument: 1-0000-7161

Inspector: 7.75 T.G.

Cal Date: 5-24-17

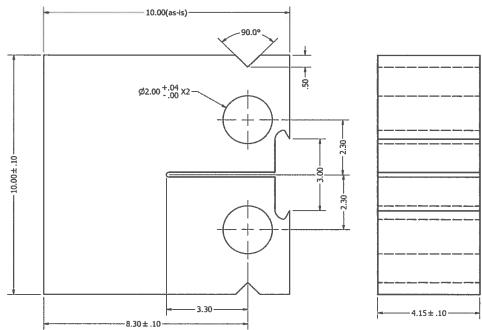
Cal Date: 5-ՀԿ- 17

Due Date: 5-24-18

Due Date: 5-24-18

Date: <u>804c17</u>

OPTICAL COMPARATOR SCHERIZ - TUMICO DIGITAL OUT /INSIDE MILL
0-6" MITUTOND



ALL DIMENSIONS ARE IN (mm) ALL TOLERANCES ARE ±0.04 (mm) UNLESS OTHERWISE NOTED

Key: T = Top, B = Bottom, GL = Gage Length

* CALIPERS MISPEAD - ACTUAL MEASURMENT - 4.05

1, 1, 2, 2, 2, 3, 2, 2, 3, 2, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3,										
AS MACHINED DIMENSIONS										
SPECIMEN I.D.	"10.00"	"10.00(as-is)"	"8.30"	"3.30"	GL "3.00"	"2.30"	"2.00"	"4.15"	"0.50"	"90.0°"
2402						T Z-30	T 200	. TEX	0.48	90.00
3KZB-1	10.01	10.01	8.30	3.30	3.04	B 2.30	B 2.00	4.03	0.48	90.00
						T 2.30	T 2.00	7c *	0.48	90.00
2	10.00	10.01	8.30	3.30	3.04	B 2.30	B 2.00	4.03	0.48	91.0
						T 2.30	T 7.00	7c.#	0.48	90.00
3	10.00	10,00	8.30	3.30	3.04	B 2.30	B 200	4.03	0.48	90.00
2.10						T 2.30	T 2.00	72 #	0.48	90.00
3LIA-1	10.00	10.00	8.30	3.30	3.04	B 2.30	B 700	402	0.48	90.00
		1				T 2.30	7 2.00	, 7c#	0,48	90:00
2	4.44	10.01	8.30	3.30	3.04	B 2.30	B 200	4.03	0.48	90.00
						T 2.30	T 2.00	TCK	0 48	90.00
3	10.00	10.00	8.30	3.30	3.04	B 2-30	B 2.00	4.03	0,48	90.0
32			_		_	T Z-30	T 7.00		0.48	90.00
3413-1	10.01	10.00	8-30	3.30	3.04	B 7-30	B 2.00	41.05	0.48	90.00
						T 2.30	T 2-00		0.48	90.00
2	10,00	10.00	8.30	3.30	3.04	B 2-30	B 2 <i>-00</i>	4.05	0.48	90.00
2				2.3	7 11	T 2.30	T 2-00		0.48	90.00
ک	10.00	10.01	8.30	3,30	3.04	B 2.30	B 2.00	4,05	0.48	90.00

Instrument: 1-1280-0000

Instrument: 1-0000_7/61

Inspector: 774 tiercom

Cal Date: 5-24-17

Cal Date: 5-24-17

Due Date: 5 - 2 4 - 18

Date:

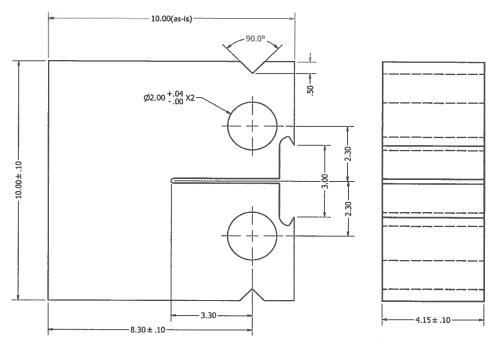
8-DEC-17

Due Date: 5-24-18

OPTICAL COMPARATOR

SCHERR - TUMICO

DIGITAL OUT/INSIDE MIC 0-6" MIT LTOYD



ALL DIMENSIONS ARE IN (mm) ALL TOLERANCES ARE ±0.04 (mm) UNLESS OTHERWISE NOTED

Key: T = Top, B = Bottom, GL = Gage Length

AS MACHINED DIMENSIONS										
SPECIMEN I.D.	"10.00"	"10.00(as-is)"	"8.30"	"3.30"	GL "3.00"	"2.30"	"2.00"	"4.15"	"0.50"	"90.0°"
						T 7.30	T 2.00		0.48	90.00
4(1-10	10.01	10.00	8.30	3.30	3.04	B 2.30	B 2-00	4.11	0,48	90.00
]			المامية	\		T 2.30	T 2-00	. "	0.48	90.0
3L1C-1	10.00	10.06	8.30	3.30	3.04	B 2.30	B 7.00	4.05	0.48	90.00
			** -			T 2.30	T 2.00		0.48	90.00
5	10.01	10.01	8.30	3.30	3.04	B 2.30	B 7.00	4.05	0.48	90.0
						T 2.30	T 2.00		0,48	90.0
7	10.00	10.01	8.30	3.30	3.04	B 7.30	B 2.00	4.05	0.48	90.00
0 40 0 1						T 2-30	T 2.00		0.418	90.00
3m13-1	10.00	10.00	8.30	3.30	3.04	B 2.30	B 2.00	4.05	0.48	90.00
			61 -			06,5 T	T 2.00		0.48	90.00
7	10.00	10.00	8.30	3.30	3.04	B 2.30	B 2.00	4.05	0.48	90.0
						T 2.30	T 2.00	,	0.48	90.00
3MIC-1	10.00	10.00	8.30	3.36	3.04	B 2.30	B 2.00	4.05	0.48	900
						T 2.30	T 7.00		0.48	90.00
	10.00	10.00	8.30	3.30	3.04	B 2.30	B 2.00	4.05	0.48	30.00
						Т	T			
						В	В			

Instrument: <u>j- 1780 - 0000</u>

Instrument: 1-0000 - 7161

Inspector: 7.75 Ticham

Cal Date:

5-24-17

Cal Date: 5-24-17

Date:

8 DEC 17

Due Date: 5-24-18

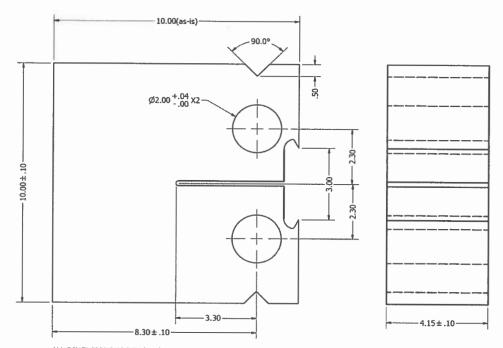
OPTICAL COMPARATOR

SCHERZ - TUMICO

Due Date: 5-24-18

DIGITAL OUT/INSTIDE MIC

8-6 MITUTOYA



ALL DIMENSIONS ARE IN (mm) ${\it ALL TOLERANCES ARE \pm 0.04 \ (mm) \ UNLESS \ OTHERWISE \ NOTED }$

Key: T = Top, B = Bottom, GL = Gage Length

				- Bottom, G						
AS MACHINED DIMENSIONS										
SPECIMEN I.D.	"10.00"	"10.00(as-is)"	"8.30"	"3.30"	GL "3.00"	"2.30"	"2.00"	"4.15"	"0.50"	"90.0°"
						T 2.30	T 2.00		0.48	90.00
3M2A-1	10.01	10.00	8.30	3.30	3.04	B 230	B 2.00	4.05	0.48	90.00
	8		41.0			T 2:30	T 2-00		0.48	90.00
2	10.00	10.00	8.30	3.30	3.04	B 5.30	B 7.00	4.15	0.48	90.00
3					<u> </u>	T 2.30	T 2.80		0.48	90.00
3m1A-1	10.00	10.00	8.30	330	3.04	B 2.30	B 2.00	4.05	0.48	90.0
			5/ 0		, .	T 7.30	T 7.00		0.48	90.00
2	10.01	10.00	8.30	3-30	3.04	B 2.30	B 2.00	4.05	0.48	90.00
5						T 2.30	T 2.00		0.48	90.00
3WSB-1	10.00	10,00	8.30	3.30	3.04	B 2.30	B 2.00	4.05	0.48	9000
			0/ >	2.5		T 2.30	T 7-00	1, _	0.48	90.00
2	10.00	10.00	8.30	3.30	3.04	B 2.31	B 2.00	4.05	0.48	90.00
						Т	Т			
						В	В			
						Τ	Т			
						В	В			
						Т	Τ			
						В	В			

nstrument: 1-12 80-0000	Instrument: 1-0000 - 7161	Inspector:	7.75
Cal Date: 874-17	Cal Date: 5-24-17		
Due Date: 5-24-18	Due Date:	Date:	1808617
OPTICAL COMPARATOR	DIGITAL OUT/INSIDEMIC		
ScHERR Tunico	0-6' MITUTO 10		

ORNL/TM-2018/861

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